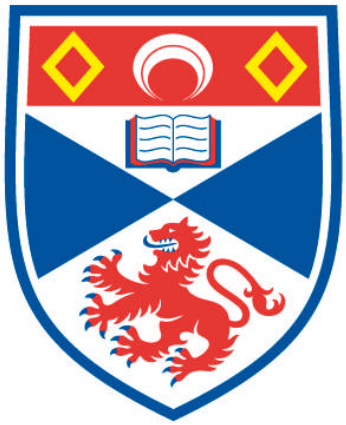
DOES AREA REGENERATION IMPROVE RESIDENTS' HEALTH AND WELL-BEING?

Daryll G. Archibald

A Thesis Submitted for the Degree of PhD
at the
University of St Andrews



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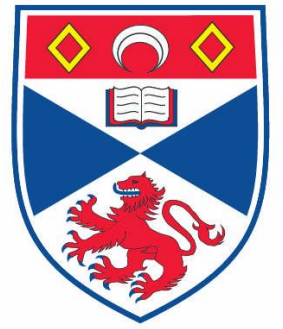

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Declaration

I, Daryll George Archibald, hereby certify that this thesis, which is approximately 80,000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree. I was admitted as a research student in September 2008 and as a candidate for the degree of PhD in Geography in the same month; the higher study for which this is a record was carried out in the University of St Andrews between 2008 and 2013.

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Abstract

This thesis investigates the implications of area-based regeneration for residents' health and well-being. The last three decades have seen significant investment in area-based initiatives in the UK to regenerate declining areas. However, there is a dearth of robust evidence on the impact that area regeneration practices have on health and health inequalities. This is particularly so in the case of the Scottish Area Regeneration Partnership (SARP) Programmes initiated in the mid-1990s, the evaluation of which was beset by a lack of baseline data and poor data collection generally. This study therefore seeks to address the lack of evidence by employing a rigorous mixed methods approach to evaluate the SARP programmes.

Firstly, a quasi-experimental analysis of data from the Scottish Longitudinal Study (SLS) is undertaken. Comparator areas were identified using propensity score matching and a series of models was fitted to examine whether health outcomes of residents and migrants differed between regeneration areas and comparator areas. This is followed by a qualitative study exploring experiences of regeneration, carried out to provide insight into the results of the quasi-experiment.

The findings provide no evidence that the programme had a positive impact on the health and well-being of SARP area residents relative to comparator area residents, and moreover, suggest that the programme may even have had a negative impact. Nor do they support the often stated hypothesis that those who move out of regeneration areas have done so because they have benefitted from the programme and been replaced with residents who are likely to be more deprived. In addition, interviews with regeneration professionals and residents found that smaller initiatives overlapped with the SARPs, making it difficult to isolate the impacts of the programme under study. The conclusion reflects on the implications of these findings for the evaluation of public policy programmes.

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There is no doubt that this thesis is the result of a substantial amount of collaboration, without which the research would never have been completed. There are many people to thank for their input.

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Chapter 1 Introduction

Over £12 billion has been spent on area regeneration initiatives in the United Kingdom over the last twenty five years. The potential to combat deprivation, improve health and reduce health inequalities is often used as justification for such a large-scale investment. However, evaluation of these initiatives has been sporadic, often producing conflicting results, thus the connections between regeneration and health remain little understood. Area regeneration programmes attempt to target and reverse the physical, social and economic causes of decline in order to create thriving communities. If area regeneration initiatives are successful in achieving these aims, then we can anticipate certain improvements in the lives of those living in places subject to these interventions. Socio-economic outcomes like employment opportunities, housing quality and educational attainment are all routinely targeted in area regeneration strategies (Cole et al. 2007) and improvements in these outcomes may positively influence health and well-being generally as regeneration projects may favourably alter the distribution of the determinants of health (Parry 2004). Two main positives can be envisaged if this occurs; first there are the direct benefits of improving peoples' physical and mental health and well-being and second are the indirect benefits for employment, quality of life, levels of stress and the cost of hospital admissions or medicines (Thomson et al. 2006). Improving health outcomes in disadvantaged areas has therefore been a central interest of regeneration policy since the early 1990s. However, the literature concerned with evaluating the health effects of regeneration shows that achieving health improvement via the means of area regeneration programmes is currently far from a well-evidenced and recognisable reality. Thus, whether regeneration activities have a discernible impact on health outcomes is a contested issue.

Section 1.1 What is area regeneration?

Brown (2006) defined area regeneration as a process involving concerted social, economic and physical action to help people in neighbourhoods experiencing multiple deprivation reverse decline and create sustainable communities", whilst Mayhew (2004:513) suggested that it is the attempt to reinvigorate a run -down urban area, such as the inner city. In addition, Couch et al. (2003:3) asserted that regeneration is concerned with the following:

> "regrowth of economic activity where it has been lost; the restoration of social function where there has been dysfunction; or social inclusion where there has been exclusion; and the restoration of environmental quality or ecological balance where it has been lost."

Thus the central features of area regeneration policy involve a commitment to intervene in an area (or areas within an urban location) classed as suffering from disadvantage by focusing on the regeneration of its physical, social and economic characteristics.

As a concept, area regeneration often covers a range of issues including: economic and financial, physical and environmental, social and community, employment, education and training, and housing (Blackman 2006). Of course, some areas may experience successful regeneration with respect to only one or a few of these dimensions, rather than the complete set and thus a number of variants - such as neighbourhood regeneration, social regeneration, economic regeneration, cultural regeneration and property-led regeneration are mentioned in the literature . These examples are seen to interlink to some extent and may be causally related. For example, Roberts and Sykes (2000:12) explained that there is an established link between poor physical conditions and social deprivation, whilst economic success may be the foundation for urban prosperity and quality of life. With this in mind, Flowerdew et al. (2003:15) stated "It is now clearly understood that, successful regeneration requires a comprehensive and coherent programme covering all aspects of community life". The current holistic approach to regeneration also implies that area-based programmes are seen not in isolation, but as part of a wider picture. Successful regeneration in one area will have consequences (sometimes negative, sometimes positive) for neighbouring areas and for other aspects of a development strategy.

Definitions of area regeneration appear to resonate with concepts of health and well-being. For example, Northridge and Schulz (2004) suggested that three domains containing fundamental factors underlie and influence health and well-being:

- The natural environment (including topography, climate and water supply)
- Macro social factors (including historical conditions, political and economic orders and human rights doctrines)
- Inequalities (including distribution of wealth, employment, educational opportunities and political influence)

Furthermore, Pacione (2005:315) stated that a number of 'external' factors are recognised to be of significance in regards to health status such as firstly, the physical environment, in terms adequacy of housing, working conditions and air quality, secondly social and economic factors such as income and wealth and employments, and thirdly access to appropriate health and social services

With these examples in mind, one can appreciate the mutual links that these domains and factors have to definitions of area regeneration. In particular, there is agreement that social, economic and physical issues are relevant to health and well-being, and it also the case that these issues are particularly relevant to the thrust of area regeneration policy.

Section 1.2 Area regeneration: historical overview

Area regeneration has been used as a policy for decades. Prior to the 1960s regeneration policies focused solely on the aim to physically improve areas. However, Pacione (2005) points to the 1960s as a time when incipient urban and social problems, caused by issues such as racial tension and a 'rediscovery of poverty' in Britain's cities by academics (e.g. Townsend 1962), sparked the then Labour government to develop a policy initiative termed the 'Urban Programme' in 1968. This initiative was set up to tackle concentrated pockets of deprivation by offering large start-up grants to local authorities intended to improve housing, health and welfare, and education in areas defined as being in 'special need'.

Flowerdew et al. (2003) explained how the Urban Programme was criticised for poor decision-making and its piecemeal approach, while its administrative department was unable to cope with applications from areas requiring investment. Furthermore, and more crucially, the funding of projects set up by the Urban Programme were seen as unsustainable due to the strain placed on local authority finances and public expenditure at a wider level. Thus, in the late 1980s the Conservative government of the time began to look into alternate ways to fund regeneration projects by encouraging the private sector to contribute financially to such projects, thus reflecting the neo-liberal ideology that attempted to reduce the role of the state and placed more emphasis on private sector wealth. Flowerdew et al. (2003) recognised that these new public/private partnerships facilitated new forms of collaboration between a wide variety of 'partners', including local community groups and business interests (e.g. banks and building societies). However, Pacione (2005) argued that initiatives such as Urban Development Corporations (UDCs), which were created to develop an environment attractive to private investment, often created conflict between economic and social goals leading to disagreement between local authorities and central government. Hastings (1995) further accused the Conservative government of privatising area regeneration policy (particularly under Thatcher) by stating that, through the process of privatisation and centralisation, the potential contribution to policy of those who did not speak the language of 'enterprise' was minimised. Following the 1997 General Election, the New Labour Government continued with the partnership policy, but shifted the emphasis from direct public sector intervention in favour of negotiated agendas and consensus seeking (Pacione 2005), where the state and local authorities 'steer' not 'row' the process of urban change.

Co-operation between different tiers of government and external agencies is now central to area regeneration practise in the UK (Jones and Evans 2006). This co-operation between different groups involved in area regeneration is termed 'partnerships', a term which has become ubiquitous in the

lexicon surrounding area regeneration. Broadly, the groups involved in partnerships are government bodies, private bodies and local community groups, which exemplifies the consensus among all political parties that a closer involvement between the public and private sectors, together with the direct participation of local communities and the ability to cut across traditional policy boundaries, are all essential elements of an effective area regeneration policy.

The participation of communities in area regeneration programmes is a crucial feature as the intended beneficiaries of a regeneration effort must have meaningful involvement in the regeneration process if it is to be successful in planning, implementation and maintenance (Hemphill et al. 2006). However, Taylor (2000:1022, cited in Jones 2002), argued that, despite government attempts at emphasizing the role of community participation in initiatives, the communities often remain as peripheral insiders on the margins of power, being "at the table but unable to influence central issues", which can often foster the resentment in the community that is 'being regenerated' . For example, Forrest and Kearns (1999) found that residents in areas that had experience of regeneration in England were highly skeptical and cynical about the process due, in part, to the 'professionalisation' of regeneration that highlighted the contrast between highly paid implementers of regeneration and the unpaid input made by local residents. For example, some residents felt that the regeneration process was not tackling local concerns such as crime and empty housing. Thus, residents felt their opinions had not counted and the authors of this study concluded that, in the eyes of local residents, regeneration is about grand visions when what these areas actually needed were decent public services.

Since the 1960s, there have been a number of major area regeneration programmes in the UK. The following table sourced from Thomson et al. (2006) provides an overview:

Table 1-1 Main activities and funding of national ABI programmes in the UK since 1969

ABI programme (ordered by date) estimated expenditure	**Main focus of programme**
Urban Programme 1969-1980s approx. £274m/year	Grant based programme to deal with areas of special social need through supplementation of existing programmes covering economic, environmental, employment and social projects.
Urban Development **Corporations (UDC)** 1981-1998 £2120m	Property and economic regeneration to attract inward investment.
Estate Action 1985-1995 £1975m	Housing led regeneration, addressing both improvements to physical aspects of housing as well as housing management.
New Life for Urban Scotland 1988-1998 £485m	Comprehensive multi-agency regeneration programme to improve housing, environment, service provision, training and employment for local people in four areas.
Small Urban **Renewal Initiatives** **(SURI)** 1990-2003 £160m+	Housing led regeneration to widen housing choice, improve quality of housing quality and the local environment, improve economic prospects and lever public and private funding.
City Challenge 1992-1998 £1162.5m	Comprehensive multi-agency regeneration to improve quality of life of residents in run-down areas.
Single Regeneration **Budget (SRB)** 1995-2001 £5703m + £20301m from private sector	Comprehensive multi-agency regeneration through initiatives on employment, training, economic growth, housing, crime, environment, ethnic minorities and quality of life (incl. health, sport and cultural opportunities).
Scottish Area Regeneration Partnerships 1996-2006 £52m	Co-ordinated approach to tackle and prevent social exclusion and demonstrate innovative practices. Main activities focus on education and training, and initiatives to reduce poverty, crime, and promote employment, enterprise, empowerment and health.

New Deal for Communities (NDC) £2000m 1998-2008	Neighbourhood based programme delivered through multi-agency partnerships. Aims: to reduce inequalities in crime, worklessness, education, housing and health between the 39 target areas and the rest of England. Key characteristics of this programme are: long-term commitment to deliver real change, communities in partnership with key agencies, community involvement and ownership, joined-up thinking and solutions, and action based on evidence about 'what works' and what doesn't.

Different programmes adopted somewhat different approaches to regeneration, and the following section discusses how two of the programmes, the SRB and the NDC, functioned.

- **Single Regeneration Budget (SRB)**

The Single Regeneration budget (SRB) approach was conceived by the Conservatives in the 1980s and was revamped by the Labour administration in the late 1990s.The SRB was the main source of support for local area regeneration in England between 1995/96 and 2000/01, with over 1000 schemes successfully securing funding (Rhodes et al. 2002:28). Central to this programme was the emphasis on a partnership- led approach to regeneration, whereby interested parties came together at a local level to devise a regeneration scheme and seek financial support through an annual bidding round run by the Government Offices for the Regions (GOR). The number and range of partners represented in the partnership varied considerably and the lead partner could be drawn from the private, public or voluntary/community sector (Rhodes et al. 2002).

To illustrate how the programme was practically implemented, Couch et al. (2003) explained that Liverpool received SRB funding for six areas throughout the 1980s and 1990s. Taking North Liverpool as an example, a partnership named 'The North Liverpool Partnership' was formed in 1998 to secure single regeneration budget funding and contained within the partnership key public, private and voluntary agencies. The partnership had identified the central problems of the area as involving low educational attainment and aspirations, high rates of truancy and exclusions, endemic youth and long-term unemployment, whilst a need for personalized basic skills training was also identified (Couch et al. 2003).The process of area regeneration in North Liverpool, financed by the single regeneration budget, took the form of a holistic attack on the above stated problems that involved a series of programmes referred to as 'routes' (Couch et al. 2003). These routes focused on three specific areas. Firstly 'Routes for People' developed policies pertaining to education, healthcare, transport and training. Secondly, 'Routes for Business' attempted to help expand existing local businesses and develop new businesses. Thirdly, 'Routes to Partnership' attempted to develop better relationships between the myriad of agencies and stakeholders within the area. Thus, we can

see here that the SRB has been a central means for attempting to deliver holistic social, economic and physical regeneration to disadvantaged areas.

- **New Deal for Communities (NDC)**

The New Deal for Communities (NDC) was a key programme in the New Labour government's strategy to tackle multiple aspects of deprivation in the most deprived neighbourhoods in the country. Mathers et al. (2008) explained that, from the outset, the NDC emphasised commitment to the centrality of community engagement within the policy. Much like the SRB, Lawless (2006) explained that the NDC involved an integrated partnership approach that resulted in every NDC initiative differing according to the specificities of each area and partnership. Thus, how change unfolds in each NDC area was dependent upon the evolving, sometimes conflicting, actions, strategies and alliances of a myriad of actors and agencies.

Both the SRB and NDC placed emphasis on partnership and the tackling of social exclusion (Couch et al. 2003). As Rhodes et al. (2002) explained, the two programmes were connected in that the sixth round of SRB funding emphasised the need for SRB bids to enhance, reinforce and add value to other initiatives and public spending programmes such as the New Deals. However, Hull (2006: 5) distinguished between the two initiatives on the basis that the NDC was designed (in a sense) to take over from the SRB; whilst a concerted emphasis was to be placed on community participation in NDC programmes that was “absent in previous renewal attempts”.

First implemented in 1998, the NDC aimed to give some of the poorest communities the resources to tackle their problems in an intensive and co-ordinated way. In addition, Cole et al. (2007) explained that the NDC had two overarching goals; to improve the beneficiary neighbourhood and to improve the life chances of those living in it. However, according to Cole et al. these two aims may induce certain tensions, pertaining to the impact that such regeneration policies have on the stability of populations living in beneficiary areas. Termed the ‘moving escalator’ problem, these tensions refer to the expectation that physical, social and economic improvements to an area implemented within the NDC programmes should result in community stability, as fewer residents want to leave the area, but evidence from a study by Beatty et al. (2005) showed that improving life chances of residents may result in those who have improved job prospects and material conditions wanting to leave the area. This results in out-movers who may be replaced by more disadvantaged households, with the result that the NDC could appear to be making communities more, rather than less, deprived (Cole et al. 2007). Therefore, we can see that, similar to the SRB, implementation of NDC programmes is subject to difficulties between the groups involved in the process and also in establishing stability for communities.

Both of these programmes have been subject to extensive evaluation studies (e.g. Batty et al.2010). However, in Scotland, the main national flagship programmes in the 1990s, the Scottish Area Regeneration Partnerships (SARPs) stand out as a comprehensive area regeneration initiative that has been subject to little evaluation. The evaluation of the programme is known to have been beset by poor baseline data collection and limited resources for monitoring and performance measurement, meaning that the core indicators were not monitored adequately (ODS Consulting 2006). Thus, in terms of health outcomes, the extent to which the SARP schemes were successful in promoting good health is unclear as impacts on health outcomes were often not measured (Petticrew et al. 2008). It is therefore the SARP approach to regeneration that this study evaluates. The following section describes the SARP approach in detail.

Section 1.3 The Scottish Area Regeneration Partnership Programmes

The SARP approach to area regeneration in Scotland comprised three area-based initiatives that were introduced to Scotland in the 1990s:

- Priority Partnership Areas (PPA) (1996-1999)
- Regeneration Programme Areas (RP) (1996-1999)
- Social Inclusion Partnerships (SIPs) (1999-2006)

  Source: Fyfe (2009)

In 1996, local authorities, backed by other local partners, were asked to apply to the (pre-devolution) Scottish Office for support for urban regeneration strategies in areas to be designated as Priority Partnership Areas (PPAs). The PPA programme was designed to bring together local and central government along with the private sector and other organisations (most notably local health boards) in a comprehensive urban regeneration strategy focused on geographical neighbourhoods, the majority of which were amongst Scotland's 10% most disadvantaged and contained populations of 5,000-30,000 people. The programme also promoted community participation in projects involved in the wider regeneration strategy. The PPA strategy centred on improving conditions in areas experiencing the most significant disadvantage measured on key socio-economic and health indicators. However, 17 of the 29 bids for PPA funding were unsuccessful following the bidding process which has since been heavily criticised on various fronts (see Taylor et al. 1999). This left 12 areas which were successful in attaining PPA designation.

Shortly thereafter, however, 9 of the 17 areas that were unsuccessful in their bids for PPA funding were awarded compensatory 'Regeneration Programme' (RP) funding by the Scottish Office. RP area programmes differed from PPAs only in that their funding was originally designed to last for 5 years as opposed to 10 years for the PPA initiative (SIP Monitoring and Evaluation Unit 1998). Thus,

from 1996 a comprehensive physical, social and economic area regeneration strategy commenced in 21 of Scotland's most disadvantaged areas, 12 of which operated under the PPA banner (10 years funding) and 9 under the RP designation (5 years funding).

The following lists the areas attached to each programme:

Table 1-2 Designated PPAs and RPs in Scotland 1996

Designated PPAs in Scotland (1996) n=12:	**Designated RP's in Scotland (1996) n=9**
Aberdeen	Cambuslang (South Lanarkshire)
Craigmillar	Dundee (various areas)
Dundee (various areas)	East Renfrewshire (Levern Valley)
Easterhouse	Edinburgh (Leith Prestonfield)
Edinburgh North	Falkirk
Glasgow East	Fife (various areas)
Glasgow North	North Ayrshire
Inverclyde	North Lanarkshire
Motherwell	Stirling
Renfrewshire	
South Ayrshire	
West Dunbartonshire	

However, following the UK general election of 1997, the incoming New Labour administration announced that the 21 PPA and RP areas would be rebranded as 'Social Inclusion Partnerships' (SIPs) *without any revision of boundaries* (Taylor 2002). The transition commenced formally in April 1999 with the new SIP areas given designated funding until 2006. The SIPs initiative had broadly the same aims as the PPA and RP programmes, in applying a comprehensive partner-led approach focusing on social, economic and physical renewal of disadvantaged areas. However, one shift in emphasis was towards a focus on tackling social exclusion. The thinking behind SIPs identified social exclusion as a primary factor in causing urban decline and thus attempted to address this through providing means to 'include' groups thought to be socially excluded, groups such as young people and ethnic minorities (Fyfe 2009). The SIPs had the goal of addressing what were thought to be the underlying causes of urban decline, which was spun politically as a break from previous regeneration policies that only planned to ameliorate the effects of decline. The key characteristics of SIPs were:

- to focus on the most needy members of society,
- to co-ordinate and fill gaps between existing programmes to promote social inclusion and to,
- seek to prevent social exclusion happening in the first place.

  Source: Taylor (2002)

In addition, 27 new SIPs were announced; 13 of the new SIPs were area-based and 14 were thematic. Thematic SIPs concentrated on excluded groups within and out with the most deprived neighbourhoods. The initial total funding for SIPs in 1999/2000 was £46 million rising to £60 million in 2003/2004 (Taylor 2002). Given that the SIP programme operated within the original boundaries of the PPA and RP programmes and focused on the same issues, this study focuses on the 21 SIP areas that originally had PPA and RP designation from 1996 in order to maximise the time frame to note potential impacts on health and well-being. Thus, the 13 areas mentioned above that were not previously subject to either PPA or RP phases of the SARP programme were not included. In addition, the 14 thematic SIP projects were not included as they were not area-based. In this thesis the programmes are referred to as Scottish Area Regeneration Partnership Areas (SARPs) to reflect the fact that I focus on all three branches of this approach to area regeneration from their inception in 1996.

The SARPs programme was evaluated by performance on 16 core indicators covering population, housing, crime, employment and training, education, health and community engagement. However, as mentioned above, a recent overview of the programme found that the core indicators were not monitored adequately, thus to date little is known on how this programme has impacted on health outcomes (ODS Consulting 2006; Petticrew et al. 2008).

The present study therefore aims to contribute to the literature on the health and well-being impacts of area regeneration practices by investigating how residents in the 21 SARPs areas outlined above fared on selected health outcomes over time. This is important as evaluations of this approach to regeneration on health are scarce, as indeed are evaluations of area regeneration impacts on health and well-being generally (Thomson et al. 2006).

Section 1.4 Thesis objectives

This thesis aims to evaluate the impact the SARP programme had on the health and well-being of residents of regeneration areas in Scotland. The specific objectives are:

i. To investigate whether the SARP programme had a positive or negative influence on health and well-being outcomes in Scotland.
ii. To investigate whether there have been differences in health and well-being outcomes between those who remained in SARP areas and those who moved in and out.
iii. To explore how the SARP programme was practically implemented on the ground.

Section 1.5 Structure of thesis

Chapter Two of the thesis introduces background literature to assess the current state of the field of research concerned the impact that area regeneration programmes have on community health and well-being. to the literature review informs the subsequent design of the research project.

Chapter Three introduces the data and the methods used throughout this thesis. The central dataset used in the study is the Scottish Longitudinal Study (SLS). A two-phase mixed methods approach is employed, using logistic regression, poisson regression and conditional fixed effects regression in Phase 1, whilst semi-structured interviews are employed in phase 2 in order to explore the results of Phase 1 at an in-depth level.

Chapters Four, Five and Six deal with the first and second thesis objectives. Each chapter employs three levels of quantitative analysis to make a robust assessment of the impact of the programme on several health and well-being outcomes. Chapter 4 assesses the impact of the programme on Unemployment and Chapter Five assesses the impact of the programme on two morbidity outcomes - Limiting Long term Illness (LLTI) and Hospital Admissions. Finally Chapter Six assesses the impact of the programme on all-cause Mortality.

Chapter Seven addresses the third thesis objective by conducting a qualitative study in a former SARP area in an attempt to understand better the practical implementation and impacts of area regeneration ‘on the ground’, and to aid the interpretation of the quantitative analyses in the previous chapters.

Chapter Eight concludes the thesis by discussing the main results in relation to the three objectives of this thesis. The limitations of this study are acknowledged and the opportunities for further research are discussed in this chapter, followed by the policy implications of the thesis.

Chapter 2 Literature review

Section 2.1 Introduction

The central objective of this thesis is to investigate whether area regeneration improves residents' health and well-being. As observed in Chapter 1, area regeneration is defined as a process involving concerted social, economic and physical action to help people in neighbourhoods experiencing multiple deprivation reverse decline and create sustainable communities (Brown 2006). Area regeneration strategies attempt to address the determinants of health such as employment opportunities, housing quality, and education to reduce health inequalities and improve the health and well-being outcomes of those residing in deprived areas. Addressing health and well-being issues has therefore become a key policy objective of area regeneration strategy. However understandings of health and well-being as concepts, the relationship between these concepts and the issues they cover is often taken-for-granted without a clear understanding of what is meant when the terms are used alongside one another. The first section of this review (2.2), therefore, explores conceptualisations of health and well-being with the aim of generating an understanding of these issues. I then discuss and evaluate conceptions of how area regeneration programmes have been theorised to improve health and well-being in section 2.3. This leads to a third section (2.4) that discusses some of the challenges associated with evaluating the impacts of area regeneration on health and well-being. The fourth section (2.5) presents a detailed overview of a selection of studies that have evaluated various area regeneration programmes in the UK, and the final section analyses these to draw out key issues that have relevance for the design of this study.

Section 2.2 Conceptualisations of health and well-being

We have seen in Chapter 1 that improving health and well-being has become a key policy objective of area regeneration strategy. This section explores conceptualisations of health and well-being with the aim of generating an understanding of these issues in order to shed light on the differences between these related concepts.

The establishment of modern medicine in the nineteenth century conceptualised health through the lens of the biomedical model, which viewed illness as beginning and ending with the biology of the human body. This view separated the mind and body by de-emphasising the idea that psycho-social factors may play a causal role in cases of disease and illness (Scott 2005:400). However Ogden (2004) explained that throughout the twentieth century the emergence of four distinct concepts challenged the assumptions of the biomedical model and identified an increasing awareness of the roles that the mind and society play in health. Firstly, psychosomatic medicine was developed in response to Freud's analysis of 'hysterical paralysis', which indicated an interaction between the mind and the

body. Secondly, the development of behavioural health demonstrated the role of behaviour in health through use of educational inputs to change behaviour and lifestyle. Thirdly, behavioural medicine was developed as an amalgam of psychology, sociology and health education, focusing on health care, treatment and illness prevention, and fourthly, health psychology emerged as a field concerned with health promotion, prevention and treatment of illness, and the identification of psychological causes and correlates of health and illness.

There is growing awareness of the need to understand sociological and ecological issues in attempting to cure illness and disease and in maintaining the health of individuals. Thus, a social model of health provides an understanding of health in the context of the relationship between a population and its social, cultural, economic and physical environments. This is reinforced by the evolving definitions of health stated by the World Health Organisation (WHO). In 1947 the WHO defined a holistic model of health that involves, "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (http://www.who.int/about/definition/en/print.html, accessed 28/03/10).

In addition to this, the WHO's Ottawa charter (1986) defined health from the perspective of a 'wellness model' that moved away from viewing health as a 'state', toward a dynamic model that presents health as a process or force. This definition held that health is, "the extent to which an individual or group is able to realise aspirations and satisfy needs, and to change or cope with the environment". (www.who.int accessed 28/03/10). The wellness model is a positive concept assuming health to be a resource for everyday life, not the objective of living, whilst also emphasising social and personal resources, as well as physical capacities.

The terms health and well-being are often used synonymously and it is therefore difficult to distinguish well-being from health within their linkages in modern definitions. Nevertheless, Flowerdew et al. (2003) explained that well-being might be differentiated from health in three ways. Firstly, in its definition, well-being incorporates a more holistic collection of aspects; secondly, in a methodological context, well-being is generally measured subjectively; and thirdly, in a conceptual sense, well-being can be distinguished from health in regards to the amount of freedom and opportunity of access to resources we have.

However, health may also be measured subjectively. For example, McKee-Ryan et al. (2005) explained that subjective physical health assessments and subjective physical well-being are synonymous as they both inquire about specific and/or general health complaints. It would seem then that there is a lack of universal consensus on definitional boundaries in relation to health and

well-being. Most of literature on well-being does appear to treat it as a concept that is (in the main) measured subjectively, whilst health (in the main) is regarded as more amenable to objective measurement. However the above example shows that semantic confusion can arise when no clear boundaries are in place to separate these two concepts, if indeed they require such definitional separation.

The literature concerning well-being as a singular concept has come to view the concept as emanating from two distinct philosophical perspectives known as hedonia and eudaimonia. The hedonic perspective concerns happiness and defines well-being in terms of pleasure attainment and pain avoidance, whilst the eudaimonic approach concerns meaning and self-realization and thus defines well-being in terms of the degree to which a person is fully functioning (Ryan and Deci 2001). From a hedonic viewpoint Theodissiou (1997) explained that well-being concerns individual feelings associated with daily activities ranging from negative psychological states (dissatisfaction, unhappiness, low self-esteem etc.) through to a more positive outlook, which extends beyond the absence of dissatisfaction to so-called positive psychological states. Diener et al. (1999) provided a wider scope in their definition of well-being, explaining that it is a broad subjective construct encompassing three specific and distinct components. Firstly, it denotes pleasant affect or positive well-being, e.g. joy, elation, happiness, mental health. Secondly, it implies an absence of unpleasant affect or psychological distress, e.g. guilt, shame, sadness, anxiety, worry, anger, stress and depression. Thirdly, they state that domain or situation satisfaction, e.g. work, family, leisure, health, finances, self also come under the scope of what constitutes well-being. Commenting on the distinction between positive well-being and psychological distress McKee-Ryan et al. (2005) stated that, whilst these two dimensions are highly correlated, several studies (e.g. Lucas et al. 1996; Viet and Ware 1983) agreed that they should be conceptualised as distinct entities. Indeed, most of the well-being literature uses the term 'well-being' in the hedonic sense, synonymous with the terms 'happiness' or 'life satisfaction'. Referring to Diener et al.'s (1999) definition, White (2007) stated that the distinction between brief emotional periods of joy or acute happiness and an underlying state of happiness is a major finding of psychological research on subjective well-being. Blanchflower and Oswald (2004) explained this distinction as centred on well-being from life as a whole (termed 'context free') and the well-being associated with a single area of life(termed 'context specific'). These aspects refer to underlying happiness through general satisfaction with life and specific areas such as relationships, health and work. White (2007) also cited Diener and Suh (1997) to illustrate how psychologists have lobbied for subjective measures of well-being to form the basis of government policy and the political assessment of a nation's success. Diener and Suh (1997) argued that subjective well-being measures add substantially to the economic indicators favoured by policy

makers to evaluate the state of society. Thus, in what is a centuries old quest to find out what makes individuals happy and what leads to happy societies, White (2007) maintained that psychological theory and testing should form a basis for political governance that moves away from a focus on Gross Domestic Product (GDP) as an indicator of a successful society to an indicator that bases a successful society on its levels of happiness measured by self-reported well-being. Thus hedonic perspectives conceptualise well-being as an internal state that represents a variety of subjective evaluations about the quality of one's life, which generally translates to the construct of subjective well-being (Henderson and Knight 2012).

Eudaimonic perspectives are, on the other hand, less well established within the well-being literature (Kashdan et al. 2008) and have been described as more complex and elusive than hedonia (Henderson & Knight 2012). From the eudaimonic perspective Prilleltensky (2005) suggested that many aspects of well-being reach into the realm of values, thriving, meaning and spirituality. Thus from this point of view well-being is "a positive state of affairs in which the personal, relational and collective needs and aspirations of individuals and communities are fulfilled" that subsumes narrow conceptions of physical and mental health, as they are "part of well-being not the whole of well-being" (Prilleltensky 2005: 54). Supporting this from a eudaimonic perspective, Damasio (2003: 268-269) suggested that well-being involves a yearning in some people to know where they are going in life that is tied to a greater concern with our immediate existence beyond the satisfaction of love, family, friendships and good health. However, Damasio (2003) further stated that this yearning is not consistent across all individuals as the needs and wants of human beings vary to a considerable degree with their personalities, their inquisitiveness, their socio-cultural circumstances and even time in their lives.

Despite this distinction between hedonic and eudaimonic conceptions of well-being, more recent contributions to the well-being literature argue for the integration of the perspectives when conceptualising well-being. For example, Henderson and Knight's (2012) review of well-being literature concluded that whilst hedonic and eudaimonic perspectives are distinct, they are also highly related and both contribute to a comprehensive understanding of wellbeing:

> "a life rich in both hedonic and eudaimonic pursuits is associated with the greatest degree of wellbeing benefits. Future research endeavours should abandon the past tendency to compare and contrast hedonia and eudaimonia so as to establish which is better. Instead the inherent value of both hedonia and eudaimonia should be recognised and attempts should be made to investigate more comprehensively how these operate in the overall context of an individual's life." (Henderson and Knight 2012: 217).

A further interesting aspect of well-being concerns the characteristics that are functional and which lead to well-being varying substantially between cultures and in different life circumstances. For example, Diener et al. (2008) refer to the work of Sapyta (1997) who found that values relating to well-being that were rated as desirable in America (such as purpose, connections, positive self-regard and mastery), were viewed as less desirable by respondents in Korea and China. In addition, the concept of social capital may also be seen to play a role in the variances involved in attaining well-being. Helliwell (2001) defined social capital as referring to the networks, norms and understandings that facilitate co-operative activities with and among groups of individuals. If the personal, relational and collective needs and aspirations of individuals and communities are to be fulfilled in order to attain well-being, we would expect to have strong social networks in place to achieve this. Putnam (2000) found that individual levels of social capital (along with income and education) had significant positive effects on well-being. In addition, Helliwell (2001) stated that an absence of social capital through individual or community disengagement can harm well-being. At the community level, Cox (2002) argued that a community with high accumulations of social capital will be able to manage difficulties such as conflict or change, whilst one with low levels will manage less well. Social capital may therefore be significant in terms of community participation in regeneration initiatives. For example, full community participation is recommended in policy informing regeneration initiatives. Thus, if social capital is not strong, the community may be unable to effect the change it feels is needed, rendering it an ineffective partner in the regeneration process.

In summary, it is difficult to distinguish the concept of health from that of well-being, thus the two concepts are generally used together to mean more or less the same thing. Definitions of health now go far beyond the biological reductionism of focusing on physical health only, by now incorporating a full range of social and mental aspects that must be met, realised and satisfied if one is to enjoy good health. In addition, well-being has been seen to be conceptualised through a dual lens emanating from the philosophical perspectives of hedonia and eudaimonia that can be taken together to provide a broad conceptualisation of the well-being experience. Furthermore, well-being has been found to be a more culturally sensitive concept than health and is essentially subjective and multi-faceted. It is a concept concerned with a full range of psychological affect along with general life satisfaction and domain specific satisfaction. This section has therefore shown that whilst the concepts of health and well-being are indeed very similar there are subtle distinctions in that well-being can be said to be concerned with a more expansive range of issues than general health, including issues such as spirituality. It is therefore the position of this thesis that the terms health and well-being can be used together in a holistic way to refer to all aspects of positive human

experience. Thus in the context of this study when I ask, 'does area regeneration improve residents' health and well-being' I am referring to the potential of area regeneration to improve all aspects of life in general for residents.

Section 2.3 How can area regeneration impact on health and well-being?

In 1980 the publication of the landmark Black Report showed the great extent and widening of health inequalities in Britain, and attributed these health inequalities to many socio-economic inequalities influencing health - such as income, education, housing, diet, employment and conditions of work (Gray 1982). An important component of the understanding of health inequalities centres on the fact that these inequalities are observed not only in terms of socio-economic groupings but also according to area of residence (Petticrew et al. 2008). Thus, premature mortality and physical and mental morbidity rates are all routinely found to be higher in the most disadvantaged areas (Scottish Government 2008). It is in this context that area regeneration schemes have been promoted in the UK as an important component of national strategies to improve health and reduce health inequalities by impacting on aspects that are known to be social determinants of health.

Within the literature on area regeneration and its relationship to health and well-being in the UK, a paper by Kearns et al. (2009) and one other by Parry et al. (2004) stand out as attempting to formally set-out how regeneration can improve health have been published. Parry et al. (2004) outline three key mechanisms by which area regeneration might impact on health. Firstly they suggested that the act of selecting a community to be a regeneration area may offer a mechanism by which the aspirations of residents can be realised. Both the empowerment of the community and the increased availability of material resources through receipt of the programme may thus act as mechanisms by which community health may be improved. However, this would appear to be fully dependent on the community having a significant say in how regeneration resources are spent, something which does not often happen. For example, Maginn (2007) argued that local groups remain on the 'outside' of decision-making during regeneration initiatives as full community participation carries a range of potentially high costs (temporal, financial and political) for institutional partners if local groups object to certain regeneration plans. With that said, Parry et al's second mechanism pertains directly to the degree to which the local communities are involved in a regeneration programme. Maginn (2007) suggested that more effective community participation in regeneration initiatives may be induced through the concept of 'inclusionary argumentation'. This is a model that emphasises inclusiveness for communities, whereby community conflict is expected and negotiated as opposed to being suppressed or ignored. Maginn further argued that

'collaborative planning theory' would offer a positive governance framework for holistic inclusion, facilitated methodologically by applied ethnography, which can, in turn, offer institutional and community partners a way forward in developing a deeper understanding of the culture within local communities. Thirdly, Parry et al. (2004) argued that the correct commissioning of projects is a key mechanism by which a programme can impact on health. However, they acknowledged that this depends heavily on an understanding of what may 'work' in a particular area, which is difficult as there are still many gaps in our understanding of the best way to improve health in disadvantaged communities.

In addition to outlining how area regeneration can act positively on determinants of health, Kearns et al. (2009) proposed six 'capitals' that regeneration might act upon to improve the neighbourhood and community context for health improvement. These are: Human and Political Capital, Social and Community Capital, Residential and Cultural Capital, Economic Capital, Fixed Capital, and Environmental Capital. They argued that to treat health problems in disadvantaged areas - such as addictions and obesity - regeneration should contain personal and social development programmes in addition to environmental and economic programmes. The introductory chapter suggested that contemporary area regeneration programmes are frequently seen as incorporating social initiatives. However, Kearns et al. (2009) maintained that personal support and social aspects of regeneration are often lacking, being underspecified and underfunded. Thus they contended that human capital, community/social capital and residential capital have received less attention in regeneration programmes than have economic, fixed and environmental capital. They therefore theorised that, if social elements were focused on, then feelings of well-being (which is often undermined by feelings of powerlessness and no opportunities for accomplishment in disadvantaged areas) will theoretically improve as a result. However, as with Parry et al. (2004) before, Kearns et al. (2009) cautioned that there is still much to learn if we are to understand how regeneration can improve health.

Section 2.4 Challenges associated with evaluating the impacts of area regeneration on health and well-being

Within the last decade the dearth of robust evidence demonstrating the impact of area-based regeneration on health and health inequalities has been widely lamented, (e.g. Wanless 2004, Rhodes et al. 2005, Kearns et al. 2009), meaning that policy makers have been unable to draw firm conclusions as to how area-based initiatives impact on residents' health. This lack of evidence has been attributed to many factors. For example, Mackenbach (2003) posited that many policies and interventions targeting health inequalities have simply not been evaluated, and those that were suffered in that they were not evaluated adequately. Similarly Rhodes et al. (2005) pointed to three

central deficiencies in past evaluations: (1) A limited understanding of the theory of change buttressing the policy action; (2) inadequate methods; (3) a focus on process and outputs as opposed to a focus on key outcome measures. As a result, calls have been made to introduce quasi-experimental designs, natural experiments and (if possible) randomised controlled trials to more rigorously asses the health and other impacts of regeneration interventions (e.g. Wanless 2004; Petticrew et al. 2004; Rhodes et al. 2005; Thomson et al. 2006,2007; Thomson 2007). There are well-documented difficulties associated with attempts to rigorously evaluate area regeneration practices. For example, Petticrew et al. (2005) stated that area-based regeneration is amongst a group of public health interventions (along with new roads and new housing) that are theorised to affect health inequalities but are often not amenable to randomisation for practical and political reasons. For example, practical difficulties would arise if a researcher has no control over how a government area regeneration programme is rolled-out, and it would be politically problematic and ethically dubious for a local authority to attempt to withhold a possibly beneficial intervention from a control group.

However, there are prominent examples from the USA where randomisation *has* been used to do exactly this. For example, the Moving to Opportunity programme which began in 1994 was a randomized, controlled trial in which families from public housing in high-poverty neighborhoods were moved into private housing in near-poor or non- poor neighborhoods, with a subset remaining in public housing (Leventhal & Brooks-Gunn 2003). Families in disadvantaged areas were randomised using a lottery system which assigned them to one of three groups: an experimental group who received a Section 8 voucher (a voucher that provides rent subsidies to purchase approved housing in the private market (Leventhal & Brooks-Gunn 2003)) and mobility counselling, but who had to move to a low poverty neighbourhood; a Section 8 group who received the voucher only, and had no restriction on where they moved to; and a control group who did not receive a voucher or any other assistance (Kearns et al. 2009). This approach has its critics for denying assistance to individuals who may benefit from the intervention (e.g. Bryson et al. 2002), however all participants in the MTO programme provided informed consent (Feins et al. 1996) and thus were well aware that they may not receive assistance.

In the UK, approaches to evaluating the impact of regeneration interventions by randomising residents to treatment and control groups have not been pursued by policy makers designing the large holistic programmes that have been rolled out since the 1990s. Petticrew et al. (2005) have thus argued that in the case of these initiatives, researchers can partially "fill the gaps" in knowledge by exploiting opportunities offered by natural experiments. Similarly Des Jarlais et al. (2004)

concluded that non-randomised evaluation designs such as quasi-experimental designs, non-randomised trials and natural experiments should be employed as they can "provide a more integrated picture of the existing evidence and could help to strengthen public health practice".

Nevertheless, difficulties in designing quasi-experimental or natural experiments remain. For example, the conclusions offered by Cotterill et al*'s* (2008) study, which is geared towards evaluating the health impacts of the New Deal for Communities (NDC) regeneration initiative using a quasi-experimental design, state that the evaluation of regeneration initiatives is "extremely challenging" due to the fact that these initiatives "represent complex multi-faceted community-based interventions that are operationalised within dynamic systems subject to many competing influences". In addition, Thomson et al*.* (2008) stated that conducting community-based quasi-experimental evaluations that are powered to detect small impacts among individuals over long periods are neither straightforward from a pragmatic point of view nor cheap. They too pointed to issues of being unable to control the timing of interventions and problems of increasing attrition in deprived communities likely to be targeted by area-based interventions. Furthermore, Thomson et al*.* (2008:934) stated that even an evaluation which achieves 100% response and incorporates a ten-year (or longer) follow-up may still be unable to generate the desired evidence due to the introduction of confounding factors:

> "Even in the short term, impacts are likely to occur in conjunction with other changes which may or may not be associated with the intervention. Extended follow-up inevitably introduces further multiple confounding due to other changes over time, be they at an individual area or societal level; and intensive longitudinal tracking of individuals may themselves have to be quite interventionist, and thus, introduce an additional confounder which is difficult to control for."

These examples, give an indication of the myriad difficulties surrounding the evaluation of the effects that area regeneration initiatives have on health and well-being. With this in mind, the following section will present an overview of a selection of these UK-based studies sequentially in order to shed light on the current progress of research concerned with evaluating the effects of area regeneration programmes on health and well-being outcomes. All but two of the studies selected for discussion have been published after Hilary Thomson et al's (2006) widely cited systematic review of the impacts of area regeneration on health, which found little evidence of a positive impact of national urban regeneration investment on socio-economic or health outcomes. The studies that I include which were published before 2006 are by Huxley and colleagues (2004) and Huxley (2005), which are part of a group of publications from an evaluation of the impact of the SRB programme on mental health. These studies appear not to have been found in the literature search conducted by Thomson et al. (2006). The selected studies focus on large UK-based area regeneration programmes

that had an economic, social and physical focus using a variety of methodological approaches. The seven studies chosen are from the UK only in order to maximise relevance to the current evaluation for the following reasons. Firstly, the programmes considered in the studies chosen for discussion are of the holistic types that have been developed in the UK since the early 1990s, such as the SARP. These differ from other programmes such as the above mentioned Moving to Opportunity programme and other programmes from the USA such as HOPE VI (Popkin et al. 2004) which focus on housing renewal. Thus, the British holistic programmes have, in addition to housing issues, adopted a focus on tackling health issues (through health promotion for example) and employability via training courses. Furthermore, these British programmes did not facilitate the evaluation process by randomising residents to treatment and control groups at the outset of the intervention. Thus the researchers evaluating these UK-based programmes had to negotiate the same issues that I will tackle in this study in terms of how to best evaluate a programme that had already started without the gold standard evaluation approach of randomisation. The studies included here adopted diverse methodological strategies to conduct evaluations such as employing quasi-experimental techniques to evaluate the impact of the programmes in order to obtain a degree of generalizability, or instead conducted qualitative research in regeneration areas, or alternatively combined quasi-experimental work with qualitative research in a single study, which has been advocated by the likes of Petticrew et al. (2005). I will therefore evaluate these studies in the following section with the aim of learning lessons that will help to develop the evaluation strategy used in this study.

Section 2.5 Contemporary approaches to evaluating the impacts of area regeneration on health and well-being

Table 2-1 below outlines the characteristics of the seven UK studies that will be discussed here. A narrative overview of how these studies were designed is then presented in section 2.5.1, followed by an overview of the results of these studies in 2.5.2 studies. Section 2.6 then discusses the implications of these findings for the present research study. Lastly, section 2.7 presents a conceptual framework that clarifies the causal pathways thought to be operating in the associations between health outcomes and the wider determinants of health.

Table 2-1 Characteristics of the seven included UK studies

Study	Programme evaluated	Design	Sample Size	Outcomes assessed	Results	Strengths	Limitations
Cotterill et al. (2008)	NDC	Quasi-Experimental	Unclear	Coronary heart disease (CHD) and unintentional injuries ('accidents')	No difference in all-cause mortality and in morbidity association with coronary heart disease or accidents either 'before or after' the implementation of the NDC initiative	Prospective controlled study. Employed an outcome measure (accidents) that has an anticipated short lag time to observe an impact following the intervention.	Study was unable to account for mobility rates in the study areas. No qualitative work was carried out to investigate the quantitative findings
Gosling et al. (2008)	NDC	Qualitative	n=21	N/A	Women felt the regeneration was imposed upon them. The regeneration of the estate had caused great frustration, disturbance, uncertainty and upset for many on the estate.	The study explored residents' beliefs in an in-depth way that quantitative work cannot allow	Small case study that cannot be generalised to a wider population.
Huxley, Rogers et al. (2004; 2005;2008)	SRB	Mixed Methods	Quantitative phase: n=1344 Qualitative phase: n=20	Mental health and quality of life	No evidence of an improvement in mental health outcomes in regeneration areas	Controlled longitudinal mixed method design	Low response for initial survey. The design did account for rates of mobility in the study areas. Time scale between the first and second surveys may have been too short to observe effects Single site study which may introduce contextual biases that limit the generalisation of the findings.

Kearns, Gibson et al. (2008)	SARP *	Mixed Methods	Mental health study: Physical health study:	**Physical health outcomes:** Long standing illness Physical functioning Common symptoms Asthma Accidents **Mental health outcomes:** Self-reported general health Sense of personal control Psychosocial benefits of home SF-36 mental health score Use of mental health medications Loneliness **Health behaviours:** Smoking Drinking alcohol Eating fruit and vegetables Walking	Indications that mental health was worse among residents in SARP areas but no positive or negative finding in regards to physical health outcomes	Prospective controlled design with qualitative component High response rates to surveys Multi-site study Wide range of physical and mental health outcomes studied	Short time given to observe programme effects on the outcomes. The process of matching regeneration areas with comparator areas had resulted in these groups being unbalanced on certain unnamed criteria.
Mathers et al. (2008)	NDC	Qualitative		N/A	Aspects of this initiative were seen to be worsening mental health amongst residents	The study explored residents' beliefs in an in-depth way that quantitative work cannot allow	Small case study that cannot be generalised to a wider population.

Stafford et al. (2008)	NDC	Quasi-Experimental	NDC areas: n=10390. Comparator areas: n= 977	Mental and physical health, employment, education, crime and environment	No evidence of an NDC effect was found either overall or in terms of differential impacts over and above the developments in the comparator areas	Prospective controlled analysis measuring physical and mental health outcomes	Resident migration was not captured. Short time-lag. No qualitative work was carried out to validate the quantitative findings.
Thomson (2003)	SIP	Qualitative		N/A	The provision of new leisure facilities can improve a community, however the removal of such facilities away from a similarly deprived community can accentuate area decline	The study used a comparative design and explored residents' beliefs in an in-depth way that quantitative work cannot allow	Small case study that cannot be generalised to a wider population.

(*not a direct evaluation of SARP, rather this was an evaluation of a wider housing investment programme which covered certain SARP areas)

Section 2.5.1 Designing evaluations

Quantitative evaluations

In regards to quantitative evaluations, Stafford et al. (2008) investigated the impact that the New Deal for Communities (NDC) initiative had on the outcomes reported in the table above. These were assessed by sex, age and educational and ethnic group. The study focused both on absolute improvements in health in the NDC areas, and on whether there have been differential changes in health across demographic or socio-economic groups over time within NDC areas. Three questions were addressed: (1) Have there been overall improvements in health or its determinants in the deprived areas targeted by the NDC initiative? (2) Have there been differential changes in health or its determinants for different socio-economic, ethnic, gender and age groups within NDC areas? (3) To what extent do any differential changes mirror what is happening in similarly deprived non-intervention areas?

The design of this study was quasi-experimental and repeated cross sectional. Stafford et al. (2008) made use of longitudinal survey data collected by MORI in 2002 and 2004 in each of the 39 areas that were awarded NDC funding. Only residents who remained in the NDC or comparator area were included in the analysis. In regards to the sample used in the study, women were over-represented, approximately 20% were from non-white ethnic backgrounds and over a third had no formal qualifications. The sex, age and ethnicity profiles of residents in comparator areas were similar to those residents in the regeneration areas in order to ensure these areas were as similar as possible to the regeneration areas with the exception that they have not experienced the programme.

A further quantitative evaluation which adopted a different approach to evaluating the health impacts of the New Deal for Communities programme in the West Midlands was that conducted by Cotterill et al. (2008). This study assessed whether the NDC had improved the health of communities by looking at trends in specified outcomes in time periods before and after the initiative commenced. The authors used a quasi-experimental method that attempted to provide an indication of the counterfactual, i.e. what would have happened in the absence of the regeneration initiative. To do this they constructed virtual area models to be used as control areas not in receipt of NDC funding. These areas (which do not exist as real discrete entities) were constructed using 2001 census output areas (COA). Thus, the authors used national census data to identify COAs out with NDC areas that were as similar in socio-material and demographics as possible to COAs within NDC areas, and combined a range of the non-NDC COAs together to construct a virtual area that was as similar as possible to the NDC areas under consideration. The authors sought to match non-NDC COAs with NDC COAs with regard to age, sex and two further central characteristics: deprivation and

ethnicity profiles. In addition the non-NDC COAs were all drawn from areas within the same local authority as the NDC areas. The authors used the Townsend score as a measure of deprivation and the ethnicity profile of each COA was constructed using the measure 'percentage white in the population'. It was decided that using a 'white and non-white' classification was the best, albeit imperfect option for matching areas as breaking non-white groups down by specific ethnicity would have given smaller numbers. All-cause mortality data and hospital episode statistics were then used to compare the health experiences of the NDC areas and the control areas. From these data the authors focused the analysis on two 'illnesses', namely coronary heart disease (as it is the most commonly targeted disease of NDC initiatives) and unintentional injuries (accidents) due to the anticipated short lag time between intervention and impact. This is important as if only short –term follow up data are available then it follows that outcomes which are anticipated to respond quickly (following the intervention) should be employed.

Qualitative evaluations

In terms of qualitative evaluations, a study by Mathers et al. (2008) explored resident non-participation in a New Deal for Communities initiative in an area of Birmingham, UK. The findings of the study touched upon mental health issues relating to a regeneration initiative. Ethnographic methods were used to gather information from residents in an NDC area. Three particular methods were employed. Firstly, direct, first-hand observance of daily behaviour recorded via field notes; informal conversations with residents recorded via field notes; and, longer, more structured interviews (Mathers et al. 2008).

A further qualitative study was conducted by Gosling (2008). The main aim of the research was to gain an understanding of women's experiences of social exclusion and urban regeneration in an area that had experienced both the Single Regeneration Budget (SRB) and NDC initiatives. The focus of the regeneration in this area was to generate new jobs and training, and to improve public spaces through the refurbishment of existing buildings, the demolition of others and their replacement with new houses and low-rise flats built by private contractors, and the transfer of housing stock to privately run housing associations. The author used qualitative methods that involved initial participant observation, preliminary focus groups and 21 semi-structured interviews with women aged 18 to 80 to explore personal understandings and experiences of regeneration and social exclusion. Gosling's work is premised upon the suggestion that urban regeneration initiatives can undermine and destroy existing local community networks, which can significantly impact upon the lives of many women who rely on local support networks to help manage social exclusion, and who

are often more involved in the community than men, especially as mothers and volunteers (Gosling 2008).

The third qualitative study included here is by Thomson et al. (2003). This study considered the mental health impacts of a regeneration initiative in Glasgow. Thomson et al. (2003) assessed how the provision (and closure) of a public swimming pool and leisure facilities through a regeneration initiative impacted on the health of people living in two deprived areas of Glasgow (three miles apart). Fourteen focus groups were carried out 14-18 months after the pool opened (or closed). In Riverside a swimming pool and sports complex was opened in 2000 as part of a Social Inclusion Partnership Programme (SIP). However in Parkview, an area socio-demographically similar to Riverside and with the same level of deprivation (but not receiving SIP funding), a swimming pool facility was closed in 1999 due to upkeep costs. Parkview also had no regeneration programme in place. The design of this study is unique amongst the qualitative studies included here. The comparative element is a particular strength and represents a useful way to contrast differences between regeneration and non-regeneration areas using an in-depth approach in order to understand residents' feelings about the area they live in.

Mixed-methods evaluations

A study by Huxley, Rogers and colleagues (2004, 2005, 2008) conducted an evaluation of the SRB area regeneration programme in a disadvantaged area in Manchester (UK) specifically in relation to mental health outcomes. This study aimed both to further understand the role played by urban regeneration in altering the degree and distribution of socio-economic variations in mental health and the impact of socio-economic and locality changes on mental health (Rogers et al. 2008). It hypothesised that the SRB would lead to more changes in the programme area than in a comparator area (Huxley 2005).

The design of the study was longitudinal using mixed methods, with an initial quasi-experimental quantitative phase followed up with qualitative interviews. For the quantitative phase the SRB area was matched using the Index of Deprivation with wards not subject to regeneration to compare the SRB area to an area where no such initiative existed (Huxley 2005). A sample of residents selected from the electoral register using computerized random selection was surveyed by post. The mental health and quality of life of the sample was measured before the SRB intervention had begun and 22 months thereafter. The main outcome measures used were the General Health Questionnaire 12, GP use for 'nerves', and the 'satisfaction with health' domain of the MANSA quality of life assessment. The MANSA is a brief quality of life assessment covering objective and subjective well-being in 8 life

domains including health (Huxley et al. 2004). Predictor variables of mental health that were employed included age, sex, marital status, ethnicity, car ownership, unemployment, housing tenure and restricted opportunities. In addition, respondents were also asked about their perception of the various types of improvements that had been planned using a 5-point categorical scale (a lot worse, worse, no change, a little better, a lot better).The qualitative phase selected 20 of the regeneration area respondents from the quantitative phase of the research in order to obtain further details about subjective views of the locality, effects of the urban regeneration programme, psychosocial well-being and perceptions of mental health (Rogers et al. 2008). This strategy could perhaps have been enhanced by also selecting a sub-section of the comparator area residents to compare how views differed among the two groups to obtain a more rigorous assessment of the programme. However, Rogers et al. (2008) make it clear that their primary interest is solely on the mental health impacts of the programme on the regeneration residents.

A further mixed methods study was carried out by Kearns and colleagues (2008). This study investigated the impacts of being housed in new-build socially rented properties on housing conditions, neighbourhood and social outcomes and the health and well-being of tenants. The full list of outcomes assessed is in included in Table 2-1 above. In addition to these outcomes the authors provide limited detail on independent variables used in analyses; choosing to mention only housing tenure, household type (e.g. lone parents, couples with dependent children) and location change. The authors studied the Scottish social housing investment programme as a whole, not just housing programmes involved in regeneration initiatives as in Scotland nearly 40% of the output from Scottish Homes urban investment in the year 1999/2000 (when the initial plans for this study were made) were in the Priority Partnership Area (PPA) phase of the SARPs programme, meaning that 60% of housing output was to occur either in urban areas not in receipt of regeneration funding or in rural areas. The authors thus noted that this offered the team involved in the study an opportunity to investigate whether the wider regeneration context produces health gains over and above housing investment in itself.

In terms of design, three survey waves were combined with two stages of in-depth qualitative interviews, implemented after survey waves 2 and 3. Wave 1 (baseline) and wave 3 (2 years after) were face-to-face interviews with 334 households who had been re-housed (intervention group) and 389 households who had not been re-housed (control group). Wave 2 was a postal survey one year after the baseline for the intervention group only. In-depth qualitative interviews were also conducted to explore the longer-term impacts of moving house and neighbourhood (n=28 for the first wave of qualitative interviews and n=22 for the second wave). The study focused on two

groups: (1) An intervention group, which consisted of people re-housed into a new general-purpose socially rented home let by a Registered Social Landlord; and (2) A comparator group, which comprised people residing in the same locality as the re-housed subjects, but who had not been re-housed from their existing dwelling. The intervention group was further divided into those who moved to another neighbourhood to get a new house (Re-locators) and those who moved house within the same area (Non- Re-locators). Lastly the 2 study groups were split between regeneration areas and other areas. The authors noted that at the time of the study these regeneration areas had evolved from PPAs to the Social Inclusion Partnership (SIP) phase of the SARP programmes. Three-quarters of the samples were in urban areas, and 44% (Wave 1) and 51% (Wave 3) were in SARP regeneration areas. The two groups were matched for location, household type and tenure, which according to the authors 'worked well' as for example, 91% of the intervention group and 99% of the control group were renting at Wave 1 of the survey, and 72% of the intervention group and 63% of the control group were families. However it was noted that whilst the groups are matched on certain criteria, they are not identical and differ in some respects, which limited the 'purity of the study' (Kearns et al. 2008). It is unclear which criteria that the intervention and comparator residents were poorly matched on. This could well represent a serious flaw in this study and undermines the ability and authority of the study to comment on what would have happened in the absence of the intervention.

Section 2.5.2 Findings from UK studies

In this section, the findings from the studies outlined above are evaluated by linking the results to the study designs outlined in the previous section.

In regards to the quantitative studies, Stafford et al. (2008) found no consistent differences between NDC and comparator areas in the pattern of health-related outcomes for different demographic groups. Small overall improvements were seen on all domains assessed in NDC areas but similar improvements were also seen in comparator areas. In NDC areas, the authors found that higher educational groups were less likely to develop a long-term illness, more likely to stop smoking, more likely to find employment and more likely to participate in education or training ($p<0.05$). In addition, older people and women were less likely to find employment and experienced smaller increases in income (Stafford et al. 2008). However, these patterns were found to be broadly similar in comparator areas, although the education gradient in participation in education or training was found to be less steep in NDC areas. Thus no robust evidence of an NDC effect was found either overall or in terms of differential impacts over and above the developments in the comparator areas.

In addition, the study by Cotterill et al. (2008) found no difference in all-cause mortality and in morbidity associated with coronary heart disease or accidents either 'before or after' the implementation of the NDC initiative, nor between NDC areas and constructed control areas. For this the authors gave two possible explanations. First, that the NDC intervention has had no effect on health or second, that the intervention had had an effect but the outcome measures used by the authors are unable to discern any change. Additionally, the issue of time lag in terms of coronary heart disease is raised by Cotterill et al. (2008) who stated that the time period of 5 years post initiation of the NDC initiative in their study may be insufficient for changes in trends of disease and mortality to occur, arguing that even if interventions in terms of encouraging healthy eating and exercise are effective, a follow up period of 10 or more years is required. In conjunction with this, the authors state that even if long-term follow-up is possible researchers need to factor in the issue of migration in regeneration areas as population movements vary substantially in the UK and can be directly affected by a regeneration initiative. An example given by Cotterill et al. (2008) is seen when individuals benefit from NDC activities by acquiring new skills that allow for better-paid employment and thus may move away from that area into an area perceived as being 'better'. In contrast, gentrification may occur in an area that has been perceived to have improved through the effects of a regeneration initiative, leading to an influx of a richer and healthier population. Therefore the authors state that migration could be considered an outcome variable, an effect modifier or a confounding factor that requires explicit acknowledgement and adjustment in analyses.

Raising the issue of migration, Stafford et al. (2008) stated that people who moved in to, or out of, the areas could were not be included in the analysis due to data limitations. They defend the omission of migrants by contending that an NDC effect may be expected to be greater for 'stayers' who have had greater exposure to the intervention. However Stafford et al. (2008) concede that an understanding of how regeneration may influence migration is important and recommend that future evaluations should compare the health and other outcomes of movers and stayers. After two years of follow-up, the authors concluded that there was no evidence of a positive effect of NDC programmes in England on health or the determinants of health. They also recommended that programme leaders should consider how to inform and include the least educated groups and design projects with a view to encouraging uptake among those with the lowest levels of education.

Both of these quantitative studies share a particular strength in that their design allowed an estimation of the counterfactual; however neither was able to demonstrate a positive regeneration effect. However, these studies were only able to comment on how the NDC programme impacted on those who remained in treatment areas, thus a significant part of the impact of the programme-i.e.

how it affects migration patterns- was not assessed and therefore represents a major limitation of both studies that I hope to address in this thesis.

In regards to the qualitative studies Mathers et al. (2008) found that official discourses from some state employed professionals acting on behalf of the NDC initiative labelled aspects of residents lives as 'improper' (e.g. teenage pregnancies), which suggested an absence of worth and in doing so damaged resident self-esteem and induced a sense of demoralisation. Thus aspects of this initiative were seen to be worsening mental health amongst residents. Similarly, Gosling (2008) found that feelings of community were undermined by the NDC programme in four key ways. Firstly, the women felt powerless within the regeneration process and felt that regeneration was imposed upon them. Secondly, the regeneration work had caused great frustration, disturbance, uncertainty and upset for many residents. Thirdly, the newly regenerated estate would include a far smaller number of rented homes, rent charges would be higher and moreover, homes were unlikely to be allocated to many existing residents such as those labelled 'old' and 'single'. Gosling noted that this meant that few of the existing residents would be able to return to the estate. Fourthly, the slow process of regeneration coupled with falling numbers of residents meant that community groups and local facilities had reduced services or had closed down altogether.

Mathers et al. (2008) stated that the NDC programme emphasised the centrality of community engagement involving the development of partnerships between residents and a range of local agencies such as the local authority, Benefits Agency, Primary Care Trust and the police. However the authors explained that in this case it was the very emphasis on community engagement with agencies that was putting certain groups under mental strain and forcing some residents to adopt survival strategies, a key element of which was the need to avoid the attention of the state, as this was viewed as dangerous by these residents. Mathers et al. (2008) also found that the state was viewed as threatening because of the consequences that certain state interventions could bring, such as having children removed from parents, being put on the 'at risk' register, being arrested for criminal activities or losing the right to receive state benefits.

Findings such as these where residents developed strategies to minimise contact with the NDC were found to be prevalent in the study prompting Mathers et al. (2008) to conclude that researchers and politicians need to start looking for the everyday forms of resistance and strategies that people use to subvert the intentions of regeneration programmes such as the NDC. To ignore these strategies that are bound up with cultural capital and persist with messages that bear no relevance to the reality of the lives of the individuals and communities will likely result in the failure of many policy strands (Mathers et al. 2008). This study thus indicates the potential of regeneration initiatives to

impact negatively upon the mental health of residents. Similarly Gosling (2008) stated that for a considerable number of people over a long period of time, isolation and social exclusion were greatly increased as a result of the closure of community groups and local facilities (Gosling 2008). Given that a specific purpose of the NDC programme was to foster a sense of community participation, these findings would seem particularly damaging to the goals of the initiative. In addition, these findings show that the NDC programme had apparent negative effects on female residents' mental well-being. The residents appeared to be disenfranchised by the initiative, which resulted in feelings of powerlessness, frustration and upset along with social isolation and exclusion – all of which are associated with the experience of mental health problems. Gosling (2008) concluded that a priority for future regeneration should be to ensure that residents in areas undergoing regeneration experience the minimum disruption possible and are kept together with other existing members of their community.

In another study, Thomson et al. (2003) found that the provision of amenities such as a swimming pool was regarded as important for health and well-being. Residents reported that their use of the pool was mainly for social contact and directly linked to relief of stress and isolation, and thus improved mental health. Social contact from using the pool was also reported to alleviate the stress of living in disadvantaged circumstances and the isolation of people across all age groups. Furthermore pool closure was one in a series of amenity closures and wider area decline. Residents reported similar but less prominent links between swimming pool provision and health, whilst health benefits of social contact were diffuse and linked to other local amenities as well as the new pool facility. Thomson et al. (2003) concluded that despite different levels of emphasis and appropriation of the use and benefits of amenities, the reported benefits of amenity provision were similar in both areas they studied, which provided empirical support to link general amenity provision with health effects, particularly mental health effects.

This qualitative research is particularly insightful and perhaps more successful in detailing the impact of regeneration programmes than the quantitative studies discussed above. It is clear from the above description of the findings from these studies that qualitative work is vitally important in evaluations of the health and well-being impacts of are regeneration in that there are many possible effects of regeneration that cannot be captured by quantitative variables. While results can be reported for outcomes such as employment and mortality, there are clearly other aspects that mat may impact both positively and negatively on health and well-being. For example we have seen above that regeneration activities can alienate certain residents and cause feelings of

powerlessness. Thus it appears clear that it will be beneficial to include a qualitative component into the present evaluation to explore more detailed aspects of regeneration effects.

In terms of the findings from the mixed method work, Huxley et al. (2004) reported that after measuring GHQ total and satisfaction with mental health at baseline and 22 months after the initiative began, there was no evidence for an improvement in the regeneration area as health satisfaction actually decreased in comparison to the comparator area. In addition, GP visits for 'nerves' were proportionately higher in the regeneration area at both time points, 19% and 12% at baseline and 17% and 12% at 22 months for the regeneration and comparator areas respectively. In terms of 'perception of improvements to the area, Huxley et al. (2004) further reported that, in the treatment area 42% perceived at least a little improvement compared to 32% in the control area. The authors further noted specific domains that had changed in favour of the treatment area, namely employment opportunities, education and training and housing, whereas a higher proportion in the control areas felt that local health services had improved. These results reflect poorly on the SRB programme, particularly in regards to local health services. It may therefore have been useful for Huxley et al. to conduct further research with those involved in implementing the programme in order to ascertain whether any problems had occurred to impede the roll out of programme activities.

In regards to the mental health outcomes assessed in the studies by Kearns et al. (2008); in the first survey wave mental health was found to be worse among residents in SARP areas than among those elsewhere. The authors stated that this was true for self-rated general health, sense of personal control and the SF-36 mental health score, where the differences were statistically significant. Kearns et al. (2008) reported that the most significant findings were in relation to the attainment of psychosocial benefits from the home, which overall increased more among SARP residents than others within the comparator group. Thus this study appears to show some improvement in mental health outcomes for residents following exposure to the SARP intervention, nevertheless no statistically significant improvements were found. However, the authors also found levels of loneliness worsened among SARP residents and this perhaps points to regeneration being a disruptive process, especially if it involves people moving neighbourhood. The qualitative phase of the SRB evaluation by Rogers and Huxley et al. (2008) found that respondents considered changes to infrastructure by the SRB initiative to be material and not substantive. In addition, the reputation of the locality and threats to personal safety were the issues of most concern to respondents. To illustrate this, Rogers et al. (2008) stated:

> "The way in which these aspects were experienced in everyday life was clearly related to feelings of entrapment and the inability to escape from negative situations - factors which have been found to be central to the formation of depression". (Rogers et al. 2008: 371)

Resident anger relating to the concept of entrapment corresponds to the variable 'restricted opportunities', which was found in the quantitative study to have the strongest association with mental health (Huxley et al. 2004). This highlights an issue of importance for those implementing regeneration schemes as the feeling of entrapment resulting from restrictions on the ability to make desired improvements may mediate the impact of environmental change on both quality of life and mental health. This therefore indicates that social forms of regeneration designed to improve individual life chances and feelings of community safety must accompany the physical regeneration of areas. Indeed, Rogers et al. (2008) found that external chronic stressors, such as noise at unsociable hours and street drug dealing, were not compensated for by improved internal living conditions and refurbishments.

In regards to the qualitative phase of the evaluation by Kearns et al. (2008) that focused on certain SARP areas, Gibson and Kearns et al. (2008) found that the impact of moving house was mediated by age (e.g. children and young people found to be the primary beneficiaries of new housing), household composition and distance of move. In addition, many of these residents had experienced psychosocial benefits due to being moved to better housing more suitable to individual needs (e.g. a mother of three children moved from an upper level flat to a house), a reduction of anti-social behaviour, and the improved physical appearance of areas. However, the authors do not comment on how moving may negatively impact on the well-being of older residents in terms of the potential for long-term social networks to be disrupted.

In addition, the review of physical health outcomes by residence in regeneration areas by Kearns et al. (2008) found that many aspects of adult physical health were worse among SARP residents compared to comparators before re-housing, which was true for outcomes such as long-standing illness, physical functioning, common symptoms, wheezing and local accidents. The authors stated that higher prevalence in SARP areas of long-standing illness and local accidents did not change over time. In respect to health behaviours, the authors found that they were worse among SARP residents at Wave 1 compared to comparators. This was seen in higher rates of current smoking; lower rates of intending to quit smoking; higher rates of heavy drinking; and lower rates of eating 5-a-day compared to comparator residents (Kearns et al. 2008). The authors further found that many of these relative positions worsened over time for SARP residents compared to people living in other areas. In addition, the most notable outcomes at Wave 3 were stated to be that SARP residents were

half as likely as others to be thinking about giving up smoking; and a third as likely to eat 5-a-day. With this in mind, as stated above in regards to the study by Huxley et al. (2004) it may have been beneficial to Kearns et al's study to conduct qualitative work with regeneration professionals involved in delivering the programme in order to understand why the programme apparently failed to improve physical health outcomes. Huxley et al. (2004) however attributed the lack of improvement on mental health outcomes in their SRB evaluation to the fact that the programme failed to address the concerns of local residents and failed to remove restricted opportunities, which appeared to be the key factor that exerted the most influence on all the outcome measures. However, the lack of research conducted with organisers of the programme means that little detail is given in terms of identifying the mechanisms by which the programme restricts opportunities and thus the ability of the research to comment on how restricted opportunities can be removed is limited.

I have concluded from the description of qualitative findings that it may be beneficial to include a qualitative component into evaluations in order to explore more detailed regeneration effects, which has of course been undertaken in these mixed methods studies. However, from the findings of the quantitative phases of the mixed method studies, I also therefore believe that it may have been useful for these studies to include within their qualitative components, interviews with professionals involved in implementing the regeneration process in order to gain a more detailed insight into the challenges associated with delivering such a complex intervention. This may have allowed an enhanced ability to comment on why an absence of a regeneration effect is observed.

Section 2.6 Summary of lessons learned from UK research on impacts of area regeneration on health and well-being

Although the studies above evaluated different regeneration initiatives with different aims and objectives, there is little evidence that these contemporary forms of regeneration initiatives have improved the health and well-being of residents. In some cases regeneration initiatives appear to have had a negative effect on mental health (Mathers et al. 2008; Gosling 2008). However Thomson et al's (2003) study showed that the provision of leisure facilities as part of a SARP regeneration scheme did benefit the mental health of residents, which supports Gosling's finding that reduced amenities undermine a sense of community (Gosling 2008).

In the studies evaluating the SRB and NDC it appears that problems relating to the participation of residents in the implementation of regeneration policy are ubiquitous and central issues in these studies. The agencies charged with implementing initiatives are portrayed in Mathers et al. (2008)

and Gosling's (2008) studies as alienating bodies that demoralise and disenfranchise residents (particularly women) in the areas they are attempting to improve. Mathers et al. (2008) described this as the persistence of agencies involved in initiatives trying to foist messages on to residents that bear no relevance to the reality of their lives, which induces the adoption of survival and avoidance strategies in these residents and in turn leads to greater levels of isolation and exclusion.

In addition, Huxley et al. (2004) and Rogers et al. (2008) showed that residents appeared to have no faith that the initiative would address the issues that concern them most whilst the failure to remove restricted opportunities and resultant feelings of entrapment are also crucial and significant aspects related to poor mental health. With that said, it is suggested that the ideological position of the New Labour Government which informed the policy behind schemes such as the SRB, NDC, SARP may in some cases be to blame for these issues. For example, Gosling (2008) argued that New Labour's definition and emphasis on 'community' in policy and initiatives often echoes New Right ideology associated with the moral underclass approach, which places responsibility rather than real power with local people. Thus Gosling (2008) stated that this results in poverty and deprivation being identified within certain geographical areas that are characterised by certain 'types' of people like lone parents; therefore lone parents are seen as the root of poverty. Attaining real involvement for residents and a degree of local ownership in regeneration projects may help to improve feelings of isolation, exclusion, powerlessness and demoralisation. With this in mind Smith (2008) stated that the structures imposed by central government are at fault in the failure to adequately involve communities in regeneration initiatives, as there are limited or frequently no funds for engaging communities in project planning during the bidding process for regeneration funding. It is thus apparent that engaging the community in the regeneration programme is critical to its success. This is a key message from these studies that will be explored further in the empirical stages of this work particularly through interviews with professionals involved in delivering the initiative (something that was seldom undertaken in the empirical research reviewed in this chapter) in order to understand the challenges associated with implementing regeneration initiatives and to ascertain the thoughts of regeneration professionals in regards to community involvement in the roll out of programmes.

What all the studies detailed above have in common is that firstly, they evaluated the short-term health effects of regeneration programmes, and secondly each of their respective analyses did not find a positive health effect of the various initiatives under study. Stafford et al. (2008) reported small improvements in certain outcomes on all domains but similar improvements were found in non-intervention areas. In addition, Kearns et al. (2008) reported a relative (albeit not statistically

significant) improvement over time for regeneration area residents compared to comparators in relation to physical functioning and common symptoms, whilst Thomson et al. (2007) reported small but statistically insignificant increases in levels of "excellent" or "good" self-reported health status, though these were also found in control groups.

Thus, all these studies reported an absence of marked health improvements following a regeneration intervention, and consequently much of the discussion in these articles centred primarily upon what may have caused this, but also considered how future evaluations could be improved. In terms of what caused the lack of observed health improvements, all authors pointed to the relatively short amounts of time that were involved to observe the health impacts of these initiatives, and thus pointed out that more time would possibly be needed to see the full effects. In addition, Stafford et al. (2008) recommended that qualitative work be done in conjunction with quantitative analysis. Cotterill et al. (2008) and Stafford et al. (2008) also draw attention to migration issues, noting that future analysis should compare the health and other outcomes of movers and stayers.

It is clear from the studies that qualitative research is extremely valuable in ascertaining in-depth experience of how area regeneration processes affect residents. However, it is also clear that attempts to quantitatively measure health and well-being outcomes associated with area regeneration in order to provide more generalizable results, is extremely challenging. All of the quantitative research in the studies outlined suffered from key methodological limitations. Four key issues that have implications for the design of the present study are therefore apparent.

The counterfactual

Firstly, it is apparent that quasi-experimental methods of evaluation using matched comparator groups are being used perhaps in the wake of calls for such approaches by the likes of Petticrew et al. (2005) and De Jarlais et al. (2004). However, a key difficulty is presented to the researcher attempting to measure outcomes associated with area regeneration using non-experimental research designs. In particular, attempts to provide an estimation of the counterfactual (i.e. what would have happened in the absence of the initiative) to establish average treatment effects is challenging. It is essential that treatment and control groups have comparable characteristics related to treatment assignment and the outcome variable of interest. Thus, Aussems et al. (2009) explained that thoughtful design and analysis of quasi-experimental data are crucial, because it is *the* way to reduce the impact of selection bias in estimating a treatment effect. Selection bias refers to any factor other than the programme that leads to post-test differences between groups. Unbalanced

treatment and control groups are therefore regarded as being perhaps the greatest limitation associated with quasi-experimental designs. Hence, causality may be difficult to establish in non-experimental studies, meaning that the results should be treated as indicative rather than conclusive (Petticrew et al. 2005).

Time-lag

Secondly, in terms of what caused the lack of observed health improvements, all authors pointed to the relatively short amounts of time that were involved to observe the health impacts of these initiatives, and thus pointed out that more time would possibly be needed to see the full effects. However, the idea that extended follow up over long periods are unfeasible is also partly due to the rates of migration that some communities experience.

Migration

Thirdly, Cotterill et al. (2008), Stafford et al. (2008) and Huxley et al. (2004) also drew attention to migration issues, noting that future analysis should compare the health and other outcomes of movers and stayers. These evaluations used shorter time lags because when rates of mobility in study areas increase, there is a greater likelihood of further moves and loss of contact with respondents. This occurs to the extent that by 5 years or more after the programme has begun the study numbers may have been either too small to conduct meaningful quantitative analysis or the analysis cannot claim to know how those originally targeted by the initiative have fared. Thus these studies were limited in that their design did not permit the tracking of individuals through time, and therefore could not account for one of the most central difficulties of evaluating area regeneration programmes - the fact that the resident population may have changed substantially during the period of the regeneration, either naturally or indeed as a consequence of the programme. For example, Bailey and Livingston (2008) stated that selective migration flows are a key means by which the intended benefits of area-based-initiatives 'leak out' of target areas, and so undermine their effectiveness. Cole et al. (2007) referred to this problem as the 'moving escalator', which can arise from existing tensions between the central objectives of area regeneration initiatives. For example, whilst holistic regeneration strategies may improve the physical environment in order to make fewer residents want to leave, they simultaneously may improve life chances through education and health promotion, which see residents want to (and actually be able to) move away, leading to them being replaced by relatively disadvantaged in-movers, which ultimately results in steadily more deprived communities (Cole et al. 2007) i.e. those who 'get on' 'get out'.

Mixed-methods approaches

In addition, Stafford et al. (2008) recommended that qualitative work be done in conjunction with quantitative analysis. This is important when undertaking a quasi-experimental evaluation of complex interventions such as area regeneration that 'treat' complex populations. As Petticrew (2005) observed, there is often no single intervention or health outcome of interest. For example, housing investment in an area may directly affect the prevalence of respiratory symptoms but may also affect burglary rates and social capital. In addition many regeneration initiatives in the UK are multiple overlapping interventions, which make it difficult to isolate their effects. Thus, Petticrew argued that complex interventions require complex methodological approaches such as using qualitative research to validate quantitative data.

Section 2.7 Thesis conceptual framework

A conceptual framework for this thesis is provided below in Figure 3-1. This framework broadly summarises the causal pathways thought to be operating between health outcomes and the wider determinants of health in the context of area regeneration interventions. The narrative description in this section will explain how the framework is conceived to summarise the process of how area regeneration can achieve improvements in health and well-being outcomes for residents.

As stated earlier in this chapter, area regeneration programmes in the UK have attempted to bring about health and well-being improvement in disadvantaged areas by adopting wide-ranging holistic strategies that target determinants of health and well-being (Stafford et al. 2006). The implementation strategies of an area regeneration programme often involve the development of initiatives that can be separated into three domains; economic, social and physical. How these strategies are implemented is crucial to the success of the intervention as poor implementation will likely have a negative impact on other stages (or the outcome). Implementation is therefore included in the framework as a crucial intermediate stage of the process of regeneration impacting on health and well-being.

2.7.1 How do economic, social and physical strategies impact on determinants of health and well-being?

Firstly, the economic focus of regeneration programmes places emphasis on regenerating the local economies of disadvantaged areas. As we have seen above, this work in the main focuses on provision of education training programmes for residents to improve employment prospects (Thomson 2006). However, debate has also been had regarding the role of regeneration in job creation. For example, Turok (2004) has stated that it is also the responsibility of regeneration

programmes to play a leading role in job creation. Nevertheless in reality, contemporary forms of regeneration have focused more on 'supply' side approaches with emphasis on education and training rather than job creation. This will be discussed more fully in Chapter 4. The idea that economic regeneration work will impact on positively on health and well-being relates to the well-established finding that those in employment will experience better health than those who are not in employment. For example, Kearns et al. (2009) stated that unemployment has routinely been found to be a determinant of ill health, often accompanied by financial problems thus resulting in psychological vulnerabilities, whilst job insecurity is also harmful to health and well-being. Thus in relation to the conceptual framework presented below, economic regeneration can improve individual determinants of health such as education and employment status. However, in addition, economic regeneration can also have a key impact at the community level in terms of population retention. We have seen in this chapter (e.g. Cotterill et al. 2008, Huxley et al. 2004, Kearns et al. 2008 and Stafford et al. 2008) that migration can potentially play a key role in the relationship between area regeneration and health improvement as those who benefit most from the regeneration programmes may move out. Thus if residents who have their job prospects boosted by economic regeneration and then move out to an area perceived as better then the regeneration programme will not have succeeded in improving the area that it has been implemented as the residents who move out will likely be replaced by more disadvantaged individuals. Thus, economic regeneration can be seen as potentially having a positive impact on individual determinants of health, whilst also potentially having a negative on community-level determinants of health if other efforts are not made to retain residents who have 'got on' through experiencing economic initiatives.

In terms of social regeneration initiatives, a key aspect of this domain of the regeneration effort is to concentrate on issues such as health promotion and tackling crime and anti-social behaviour. In relation to the conceptual framework presented below, it is clear that components of health promoting initiatives have the ability to positively impact on individual determinants of health such as physical activity levels and the quality of residents' diets at the individual level. At the community level social regeneration initiatives that tackle anti-social behaviour and crime may, if successful, impact positively by reducing negative perceptions of disadvantaged areas which may work to offset the potential of residents leaving if their economic prospects have improved by reducing negative perceptions of disadvantaged areas.

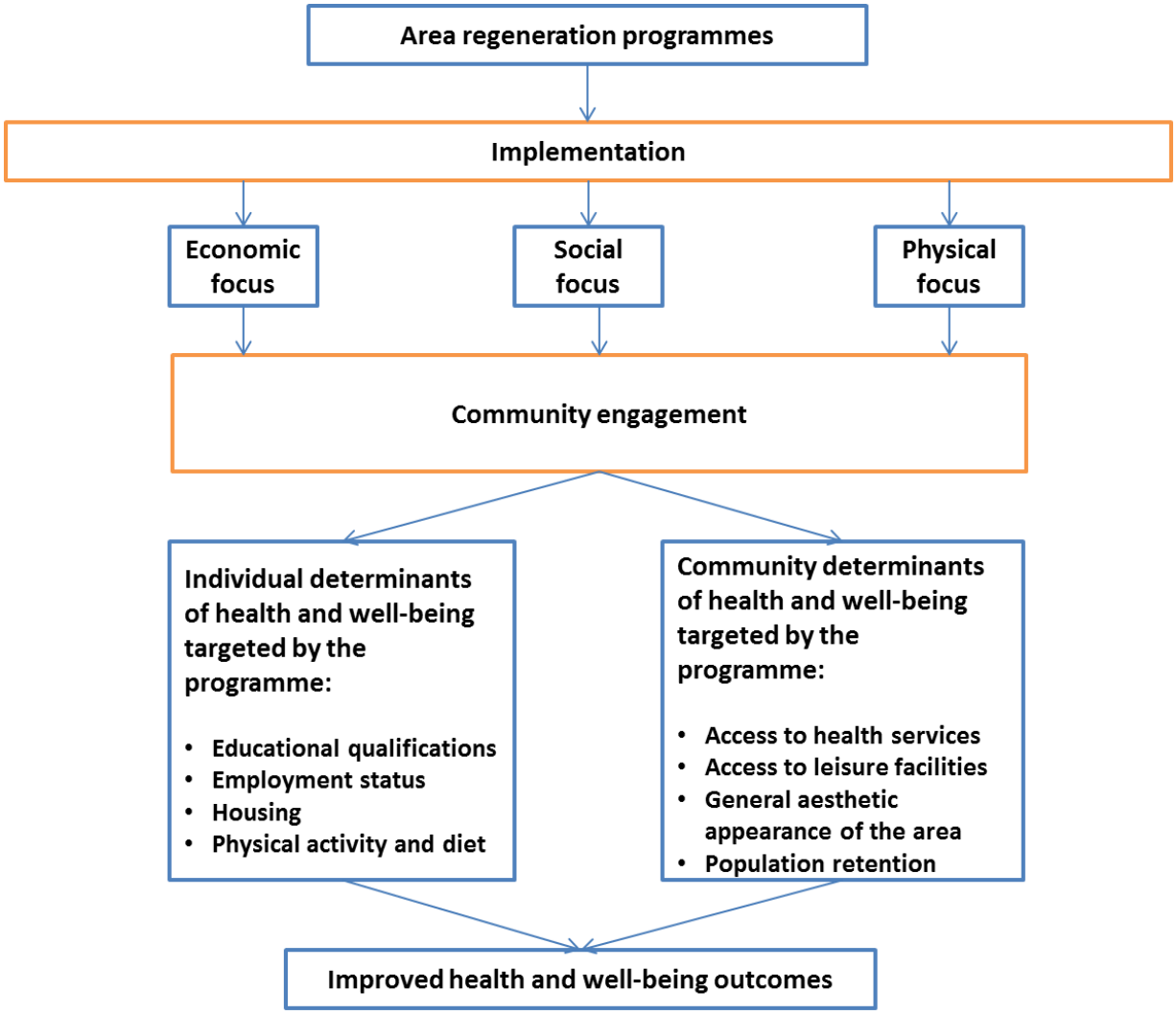
The physical focus of regeneration programmes also aim to impact on the determinants of health shown in the conceptual framework below. Physical regeneration includes crucial infrastructure

renewal projects in disadvantaged areas such as new housing, new public services and the provision of green space. In terms of individual sense, a key aspect of physical regeneration to impact on determinants of health can be observed in relation to housing. By improving the quality of rental properties, health and well-being can be improved by making housing more energy efficient and thus warmer, which can reduce respiratory problems (Kearns et al. 2008). Moreover, housing renewal that improves the appearance of housing can improve mental health and self-confidence in residents. The aspects of physical regeneration that focus on improved public services can also impact positively on community determinants of health and well-being. For example, projects that increase access to health services by using regeneration funding to establish new health centres in disadvantaged areas can improve health and well-being outcomes for residents. Similarly physical regeneration projects that establish leisure facilities in disadvantaged areas such as a swimming pool or new park will have health benefits for residents that use these facilities. In addition, physical regeneration projects will also improve the aesthetic appeal of an area and thus enhance the likelihood that the population will be retained and also perhaps encourage in-migration of wealthier and healthier residents through gentrification processes.

However, we have also seen in this chapter that community engagement is crucial for this three-pronged (economic, social and physical) effort to be successful. Community engagement is important as the regeneration efforts can only succeed through community buy-in. Thus in the framework below community engagement is included (like implementation outlined earlier) as an intermediate stage through which other stages or the outcome can be impacted. Previous research outlined above has suggested (e.g. Mathers et al. 2008, Gosling 2008) that, without community engagement, residents feel disempowered and alienated. It is therefore key that the community 'being regenerated' have an active involvement in regeneration programmes so that regeneration professionals can be aware of the main economic, social and physical needs in each community in order to secure health and well-being improvement.

In summary, Figure 3-1 summarises the process by which area regeneration can impact on determinants of health to induce improvements in health and well-being outcomes for residents. This process begins with the implementation of the programme which focuses on delivering projects across economic, social and physical domains. The success of these projects relies on the buy-in of the community that is being served by the programme. If this is achieved then the economic, social and physical projects will address (in the ways outlined above) various individual and community level determinants of health and well-being which can then produce improved health and well-being outcomes for residents over time.

Figure 3-1 Thesis Conceptual Framework



Section 2.8 Conclusion

This chapter has addressed a number of issues. Firstly, I explored conceptualisations of health and well-being in order to generate a clear understanding of what is meant by these concepts. I then discussed conceptions of how area regeneration programmes have been theorised to improve health and well-being. This led to a further section that discussed how area regeneration can impact on residents' health and well-being. In addition I also presented some of the challenges associated with evaluating the impacts of area regeneration on health and well-being. The fourth section presented a detailed overview of a selection of studies that have evaluated various area regeneration programmes in the UK. The final section analysed these to draw out key issues that have relevance for the design of this study before a conceptual framework diagram was presented which demonstrated how the findings from previous studies can be applied to the present research.

Finally, the studies discussed in this chapter underline that the research field concerned with evaluating the effects of area regeneration initiatives is still at an early stage of development. Indeed no studies to date have found any significant health improvements - physical or mental - following regeneration interventions. Despite this, Thomson (2008) stated that, "lack of evidence is not grounds to abandon the concept of healthy urban policy; adoption of more realistic expectations, together with improved evaluation data may help to increase its credibility". The following chapter will outline the data and methods used in this research.

Chapter 3 Data and Methods

Section 3.1 Introduction

The previous chapter reviewed the background literature relevant to the research objectives set out in Chapter 1. The findings of the literature review established key challenges associated with measuring health outcomes associated with area based regeneration that will be tackled in this thesis. The strategy to tackle these challenges is laid out in this chapter which comprises five broad sections. Firstly, a brief overview of the study design is provided, followed by a section outlining the epistemological perspective underpinning this work. This is followed by a section that describes the ethical issues raised by the research. Finally, two longer sections are presented which deal sequentially with all aspects of specific stages of the study, including data used, methods employed, sampling and analyses.

Section 3.2 Study design

To address the findings of the literature review the study adopted a mixed-methods approach to evaluate the impacts of the Scottish Area Regeneration Partnership Programmes (SARPs) on community health and well-being in Scotland. A mixed-methods approach was chosen after considering the literature discussed in Chapter 2.

It is important to recognise the limitations of research design when evaluating the health impacts of area regeneration programmes. As Petticrew et al. (2005) point out; practical and ethical considerations often mean that it is often not feasible to conduct controlled or randomised experiments. Thus in any systematic approach to evaluation it is necessary to adopt a quasi-experimental research design. These approaches have advantages in that they can result in study conditions that can be more like real world settings and therefore have greater external validity (Luellen et al. 2005) than RCTs. In addition, expected outputs and outcomes can be identified by quasi-experimentation, and if these are tracked over time, we can confirm or disconfirm that expected changes are occurring. However, quasi-experimental approaches have limitations in that they are unable to definitively establish a link between cause and effect and can be low in internal validity in the absence of randomisation.

In addition the lack of control that that researchers undertaking quasi-experiments have in terms of the timing of the intervention also limits the ability of the researcher to be able to understand how the initiative was rolled out and also how engaged and involved the community were in the programme, which is vitally important to the success of any area regeneration programme. Thus, as

was highlighted in Chapter 2, it is also important to carry out qualitative work with both residents and those who were responsible for implementing the programme to shed light on these issues. Thus qualitative research can be employed to help to shed light on answers to questions about the acceptability, sustainability and implementation of interventions (Petticrew et al. 2005).

With the above in mind, a two-phase sequential Quantitative-Qualitative mixed-method approach was chosen to evaluate the impact of the SARP programmes on resident health and well-being. The sequencing of the phases was chosen in order to firstly use national level data from the Scottish Longitudinal Study in a quantitative phase obtain the (hitherto unknown) national picture in regards to how the SARP programmes had impacted on the selected outcomes, which was then be followed by an in-depth qualitative phase that aimed to interview regeneration professionals involved in implementing the programmes and residents who had experienced the impacts first-hand with the aim of using this phase as a tool to shine light on the results of the quantitative analysis.

Referring back to the thesis conceptual framework provided in Chapter 2, we can observe that the qualitative phase of this research therefore focuses on the two factors identified as intermediate stages of the area regeneration process. These stages (implementation and community engagement) cannot readily be understood quantitatively yet are important as the success of the programme may heavily depend on effective implementation and community engagement with the programme. Thus, these factors are focused on in the qualitative phase of the research.

Section 3.3 Epistemological basis of the research

In undertaking a mixed-methods approach to researching the impacts of area regeneration on health and well-being the epistemological focus of this study aligns itself with that of Tashakkorie and Teddlie (1998, 2003) who argued that the defining characteristics of the mixed-methods approach involve its use of:

- Qualitative and quantitative methods within the same research project.
- A research design that clearly specifies how the quantitative and qualitative elements of data collection and analysis will be sequenced and prioritised.
- An explicit account of the manner in which the quantitative and qualitative aspects of the research relate to each other with emphasis on how triangulation is used.
- Pragmatism as the philosophical underpinnings of the research.

The pragmatist paradigm is centred upon the tenets of paradigm relativism, meaning that a researcher can and should use whichever philosophical and/or methodological approach that works best for the particular research problem under study. Giddens (1997:549), for example, stated that

as all research methods have their advantages and limitations, using several methods in a singular piece of research, and using each to supplement and check on the others is valuable practice. Morgan (2007) explained that within the pragmatist paradigm, the key concepts of abduction, intersubjectivity and transferability allow the mixed-methods researcher to work back and forth between the dichotomous poles of qualitative and quantitative approaches, thus incorporating the tenets of pragmatist philosophy. The following table developed by Morgan (2007) shows how the pragmatist paradigm is differentiated from those epistemological approaches that lay claim to either qualitative or quantitative approaches on these key issues:

Table 3-1 Pragmatic Alternative to the Key Issues in Social Science Research Methodology

	Qualitative Approach	**Quantitative Approach**	**Pragmatic Approach**
Connection of theory and data	Induction	Deduction	Abduction
Relationship to research process	Subjectivity	Objectivity	Intersubjectivity
Inference from the data	Context	Generality	Transferability

Source: Morgan (2007:71)

The pragmatist paradigm has however been criticised by the likes of Pawson and Tilley (1997), who (from a critical realist perspective) stated that it is not sufficient to offer the pragmatic suggestion that social research inquiry should use some 'combination' of structured and unstructured data collection methods. They state that the combination of methods can be detrimental in the following ways:

- 'Combination' could be understood as an injunction to deliver every research issue in the form of items in a semi-structured interview, or conversely to mount a tick-box questionnaire alongside a series of informal conversations.
- **'**Combination' could quite easily involve conjoining the faults instead of the virtues of the standard methods.
- 'Combination' can invite the collection of a surfeit of different types of information – quite possibly telling tales that simply talk past each other.

What Pawson and Tilley argued for is that the combination of qualitative and quantitative data should do more than offer 'weight of evidence' but also should invite a sense of explanatory 'completeness', 'synthesis' or 'closure' (p.158). Despite this critique of the pragmatic paradigm,

general consensus within the mixed-methods research community appears to uphold its values (Denscombe 2008). In addition, it was my intention to use the pragmatic approach in a synthesised fashion specifically to attain a more 'complete' understanding of the impact that area regeneration has had on health and well-being. Mixed-methods use is, it seems to me, entirely appropriate when researching this subject. Quantitative methods are used to provide a multi-site analysis that is more generalizable than single site studies, and qualitative methods are used with the aim of shedding light on the results of the quantitative analysis by investigating issues that the quantitative modelling cannot take into account, such as potentially heterogeneous elements of the implementation of a regeneration programme and how local residents actually felt about the programme and subsequently their engagement with it. Thus, qualitative data is employed here to validate the quantitative data.

Section 3.4 Ethical considerations

As this work had two separate phases using different research methods, ethical approval was sought for both phases separately from UTREC, the University of St-Andrews Ethics Committee.

- **Quantitative phase 1**

Firstly, the initial quantitative phase involves the secondary analysis of data obtained from the Scottish longitudinal study (SLS). These data hold a range of personal information about individuals but the dataset is anonymised and the researcher has access only under tightly controlled conditions. Instead of having a process of informed consent, strict confidentiality procedures have been put in place for any research that uses the SLS. These procedures take the form of four key measures that have been approved by the multi-centre research ethics committee for Scotland (MREC). According to Hattersley and Boyle (2007) these procedures include:

- Strictly controlling the dataset itself. The SLS is based on individual-level data for a sample of twenty birth dates known only by the small group of researchers who maintain the dataset.
- Strictly controlling the environment in which the data are managed. The data are held in a secure network of the SLS which is physically in the buildings of National Records Scotland (NRS)
- The creation, maintenance and use of the SLS being overseen by a steering committee. Every proposed project is considered by the SLS research board which grants permission for studies to be undertaken. No projects are approved that may compromise the anonymity of individuals.

- Access to the data being strictly controlled once a project has been agreed. The data is not publicly available, instead a subset of the data is created for each project, from which the researcher can choose from two strategies to do analyses. One is to use remote access to allow the researcher to send syntax (SPSS, SAS, and STATA) which is run on their behalf. The results are checked to make sure that the outputs contain no identifiable information. Alternatively the researcher can visit a safe setting within NRS to work on the data alongside a member of the SLS support team. Again only non-disclosive results can be taken from the safe setting.

These steps ensure that this research will maintain the anonymity of subjects, which in turn ensures that potential for harm to individuals is avoided. Ethical clearance was awarded to this phase of the research in January 2010.

- **Qualitative phase 2**

The qualitative phase of the research conducted semi-structured interviews with individuals who had experience of living in a SARP regeneration area and also with key informants who were involved in implementing the regeneration programme in that particular area. An information sheet (Appendix 3) about the study was given to all prospective participants. It was made clear that participation was voluntary and all participants were made aware they could withdraw at any time without having to give an explanation. Procedures involved in the study were explained in the information sheet. Prospective participants were also given a 'coded data consent form' (Appendix 3) where the researcher sought written consent. All prospective respondents were supplied with the study materials (participant information sheet and coded consent form) at least 24 hours before the interview took place.

Interviews with participating residents were conducted either in the homes of individuals or in a community centre. Interviews with key informants were conducted in a community centre. It was recognized that interviewing residents in their own homes presents possible risk to the safety of the researcher, thus the researcher carried a mobile phone at all times and had a contact individual who knew where and when all interviews were taking place. All interviews were recorded using a digital Dictaphone. All participants were asked if they consented to this or not via the 'coded data consent form'. The information sheet will inform participants that they can omit questions they do not wish to answer. The information sheet informed the participants that their data would be treated with full confidentiality and that, if published, the data would not be identifiable as theirs. In addition, the information sheet also informed participants that the data would be stored on a password protected computer accessible only to the researcher.

There was some possibility for participants to experience some degree of upset or distress during the course of an interview, which may be the result of negative experiences associated with area regeneration. For example, certain past research (e.g. Kearns et al. 2008) has highlighted that residents subject to regeneration have had friendship networks disturbed to the detriment of their mental health. With this in mind, the information sheet made it clear to participants that an interview can be stopped at any time should any unpleasant memories or emotions be triggered by the interview. Furthermore, a debriefing form was issued following the interviews to cater specifically for participants who had experienced any unpleasant or distressing emotions and memories by participating in the study. This form contained details of what participants could do to find support (such as counselling services, G.P.) for any issues they had which related to their health and well-being following the interviews.

Ethical clearance was awarded to this phase of the research in May 2011.

Section 3.5 Phase 1: Quasi-experimental analysis of longitudinal data

As observed in Chapter 2, there are well-documented difficulties associated with attempts to rigorously evaluate area regeneration practices. For example, Petticrew et al. (2005) stated that area-based-regeneration is amongst a group of public health interventions (along with new roads, new housing) that are theorised to affect health inequalities but are often not amenable to randomisation for practical and political reasons. Practical difficulties would arise if a researcher has no control over how a government area regeneration programme is rolled-out, and it would (for example) be politically problematic and ethically dubious for a local authority to attempt to withhold a possibly beneficial intervention from a control group. Consequently, the practical and ethical difficulties associated with evaluating public health interventions by using randomised trials render them unsuitable in the majority of cases. Petticrew et al. (2005) thus argued that researchers can partially "fill the gaps" in knowledge by exploiting opportunities offered by natural experiments. Similarly Des Jarlais et al. (2004:361) concluded that non-randomised evaluation designs such as quasi-experimental designs, non-randomised trials and natural experiments should be employed as they can "provide a more integrated picture of the existing evidence and could help to strengthen public health practice".

The objective of Phase 1 of the research was therefore to conduct a quasi-experimental multi-site analysis of the health and well-being impacts of the SARP programmes using national-level longitudinal data. However, in order to deliver this objective successfully the analysis had to be designed in such a way that the three key challenges to measuring health outcomes associated with area based regeneration identified in the literature review were addressed. To recap these were:

- **The counterfactual**

Attempts to provide an estimation of the counterfactual (i.e. what would have happened in the absence of the initiative) to establish average treatment effects is challenging. It is essential that treatment and control groups have comparable characteristics related to treatment assignment and the outcome variable of interest. Unbalanced treatment and control groups are therefore regarded as being perhaps the greatest limitation associated with quasi-experimental designs.

- **Time –lag**

It is common for evaluations to use relatively short time lags (< 5 years) post-initiation of regeneration programmes to observe potential changes in specified health outcomes. However, it has been suggested that it is likely that time lags of less than 5 years are insufficient for changes in trends of disease morbidity or mortality to occur (Cotterill et al. 2008).

- **Migration**

Selective migration flows are a key means by which the intended benefits of area-based initiatives 'leak out' of target areas, so undermining their effectiveness (Bailey and Livingston 2008). Some past evaluations (e.g. Huxley et al. 2004, Stafford et al. 2008) have at points suffered in that their design does not permit the tracking of individuals through time, resolving instead to compare population characteristics before and after the regeneration process, thus not accounting for the fact that the resident population may have changed substantially during this period.

Section 3.5.1 Data used to overcome these challenges

- **The Scottish Longitudinal Study**

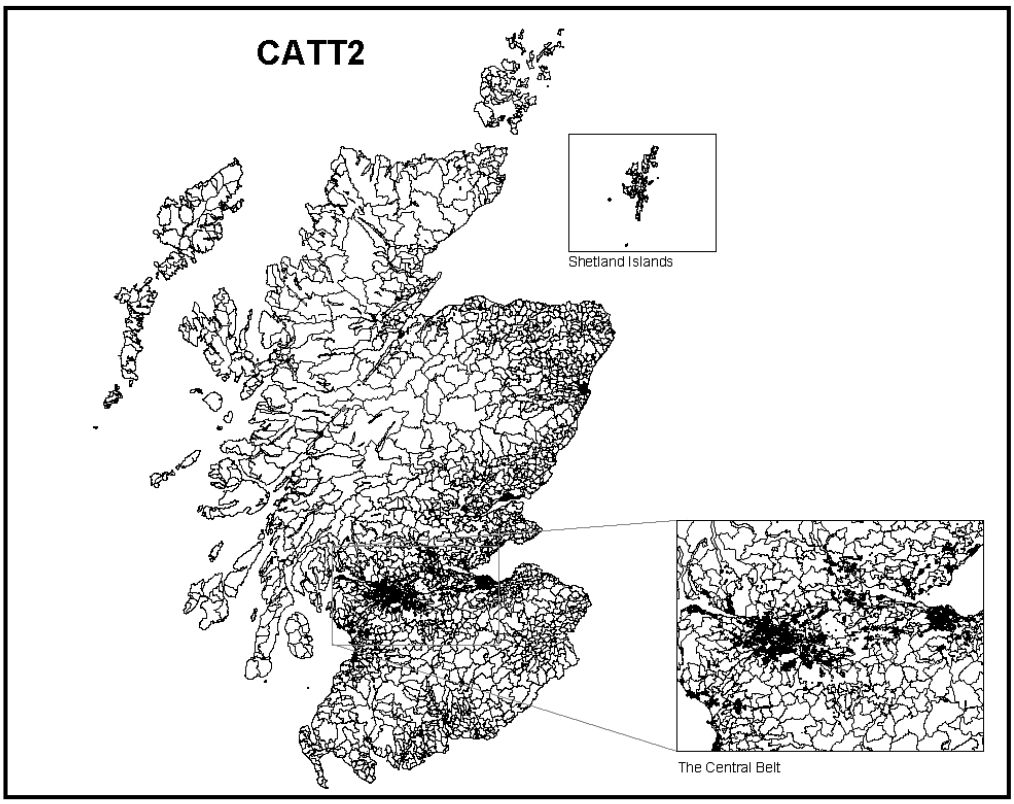
The key dataset used in this study is the Scottish Longitudinal Study (SLS) (http://www.lscs.ac.uk). The SLS is based on 20 semi-random birth dates capturing 5.3% (around 270,000 individuals) of the Scottish population. The dataset is created through record linkage including a range of routinely collected information including 1991 and 2001 census data, vital events (births, deaths, and marriages/ civil partnerships) data, cancer registry and hospital admissions data. A key advantage of using the SLS is that it enables one to follow individuals through time identifying changes in their health and well-being conditions and also account for migratory patterns in regeneration areas. The SLS data also permit a longer time period (1991-2001) to observe the effects of area regeneration initiatives than has been possible in some other evaluations. However, given that the data is predominantly based around records from UK census data (beginning in 1991) an extended follow-up (>10 years) will not be possible until the records from the 2011 UK census are integrated into the SLS. Nevertheless, in using the SLS one can access records for a period of 10 years. In addition, the

large sample of individuals included in the SLS overcomes the problem of small sample sizes that have limited the ability of other studies to generalize their findings to the wider population (Boyle et al. 2008).

Section 3.5.2 Establishing the regeneration area boundaries

Measuring the health effects of area regeneration programmes over time presents a series of challenges to overcome. Another important challenge is that, between 1991 and 2001, census boundaries changed in Scotland making it difficult to compare health trends for small areas. To combat this I employed Exeter et al*'s* (2005) Consistent Areas Through Time (CATTs). CATTs are aggregates of the 1981, 1991 and 2001 Scottish census output areas (COAs, in 1981 they were enumeration districts (EDs)). The construction of CATTs was conducted to ensure they are consistent through the 1981, 1991, and 2001 Scottish censuses and therefore allows for reliable analysis of varying demographic, social and economic circumstances at the local level.

Figure 3-2 Map showing the 10,058 CATTs in Scotland. Source: Exeter (2004)

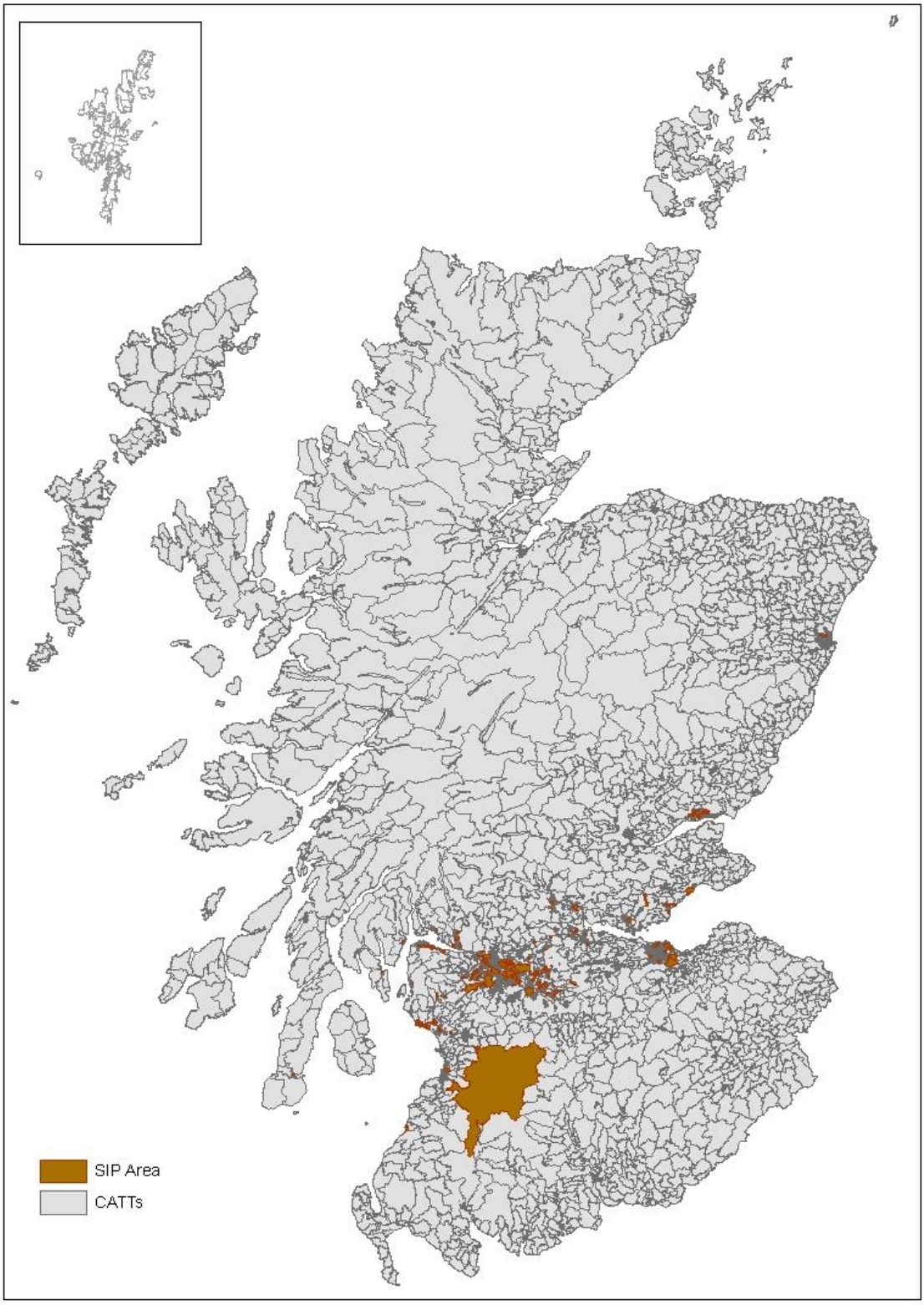


Given that CATTs provide a means for comparing small areas between 1991 and 2001, the next step was to establish the boundaries of the regeneration areas of interest.

As explained in Chapter 1, the goal of the research was to analyse the 21 Scottish Area Regeneration Partnership (SARP) areas that had Priority Partnership Area (PPA) and Regeneration Partnership (RP) status in 1996, and which subsequently evolved into Social Inclusion Partnership (SIP) areas in 1999. This allowed for a 5 year time lag (1996-2001) in which to observe any changes in health trends, using 1991 as a baseline. To establish the regeneration area boundaries boundary data was requested for the PPA and RP programmes from the Scottish Government, which was delivered in the form of postcodes. Once in possession of this data I linked the boundary data to Census Output Areas (COAs), which are the smallest unit of census geography in the UK. When the boundaries of these regeneration areas were established at COA level these were then linked to the CATTs system so that a list of CATTs defined as PPAs and RPs in 1996 were generated, effectively the treatment group. Thus, the CATTs system facilitated the observation of how regeneration areas had changed from 1991 to 2001.

Of the 10,058 CATT areas in Scotland the linkage of PPA/RP areas to CATTs identified 1,384 CATTs that could be defined as regeneration areas. However, 21 were removed because they were too large and encroaching into rural areas. In addition 18 were dropped because they were found to be in the least deprived of deprivation quintiles. This left 1345 regenerated CATTs, which subsequently meant that 8,674 CATTs remained for potential selection as comparator areas.

Figure 3-3 Map Showing SARP area boundaries in Scotland following the transition to Social inclusion Partnerships in 1999



From this map it can be observed that the SARP areas are mostly concentrated in the Central Belt of Scotland.

Section 3.5.3 Establishing comparator areas: propensity score matching

- **The concept of propensity score matching and its advantages**

Leyland (2010) stated that "If the community is the unit of intervention then it is at the community and not the individual level that balance must be achieved". With this in mind, to provide a measure of the counterfactual, the next stage of the analysis involved selecting appropriate control CATT areas. Areas - as opposed to individuals - were used as the unit for matching due to the nature of the 'treatments' of interest, i.e. regeneration initiatives that specifically targeted *areas.* This was carried out using the propensity score matching technique.

The propensity score matching technique aims to balance two non-equivalent groups based on observed covariates to gain a more precise estimate of the effects of a treatment on which the two groups differ (Luellen 2005). The technique was first outlined by Rosenbaum and Rubin (1983) who showed that matching on a single index that reflects the probability of participation could achieve consistent estimates of the treatment effect in the same way as matching on all covariates. This index is the propensity. Thus Rosenbaum and Rubin (1983) defined the propensity score as the conditional probability of receiving treatment given the set of confounders and the approach shares a number of assumptions with regression based approaches. The clear advantage of propensity score matching is that it replaces high-dimensional matches with single-index matches. The propensity score reduces the discrepancies observed in the characteristics of treatment and control groups, and thereby reduces the bias in estimation of the treatment effects with observational data like surveys, administrative records and census data. However, matching on propensity scores can suffer if poorly measured variables are employed to obtain the propensity score (Bryson et al. 2003). In this case, deprivation variables from the 1991 census were used to ensure the variables were of good quality.

- **How the Propensity Score Matching process is conducted**

According to Barth et al. (2008) conducting a process of propensity score matching involves a three-step analytic procedure. The first step involves estimating the propensity score using logistic regression. Here a logistic regression is used to identify factors 'predicting' exposure to the intervention. The model is used to calculate each individual's predicted probability of, rather than actual, exposure to the intervention (Cousens et al. 2003). Thus, the predicted probability is the propensity score which in the case of this study is the probability of being in a SARP area.

The second step involves matching treated subjects to non-treated subjects on the basis of the estimated propensity scores. Barth et al. (2008) explained that after estimated propensity scores are obtained, cases are matched to create a new sample of cases that share approximately similar

likelihoods of being assigned to the treatment condition. Thus, individuals or areas with similar propensity scores are grouped and within each group, some individuals will actually have been exposed to the intervention and some not. Since individuals in each group had the same propensity to be exposed, the method assumes that actual exposure within these groups was random (Cousens et al. 2003). There are currently multiple forms of matching in use; however in this study the matching method used was the nearest neighbour method with caliper. This method is conducted via the following three stages:

i. Firstly the treated and non-treated subjects are ordered randomly.
ii. Secondly, the first treated subject and non-treated subject with closest propensity. Score is selected within the pre-determined common support region called a caliper.
iii. Thirdly, both subjects are then removed from consideration for matching, and the next treated subject is selected (Barth et al. 2008).

Nearest neighbour matching within a specified caliper specifies that the absolute difference in the propensity scores of matched subjects must be below some predetermined threshold called the caliper distance. Austin (2011:404) explained how this works:

> "for a given treated subject, one would identify all the untreated subjects whose propensity score lay within a specified distance of that of the treated subject. From this restricted set of untreated subjects, the untreated subject whose propensity score was closest to that of the treated subject would be selected for matching to this treated subject. If no untreated subjects had propensity scores that lay within the specified caliper distance of the propensity score of the treated subject that treated subject would not be matched with any untreated subject. The unmatched treated subject would then be excluded from the resultant matched sample."

The third step of the process according to Barth et al. (2008) is analysis of the treatment effects based on the matched sample to answer the research questions of the study. Thus at this stage bivariate or multivariate analysis is conducted to compare outcomes between the treated and comparator groups in order to assess treatment effects for the treated group.

- **How the propensity matching was applied in this research**

Thirty-nine variables (See Appendix 5) were extracted from the 1991 census and the PSMATCH2 function in STATA 10 was used for the propensity matching procedure (Leuven and Sianesi, 2003) in order to identify places that matched the characteristics of the regeneration areas. The areas that received SARP regeneration were significantly deprived areas that were chosen for funding following a bidding process. This made it possible to conduct this quasi-experiment as there were other similarly deprived areas in Scotland that were not allocated funding because a bid was either not submitted or bids that were submitted were considered unsuitable. It was therefore important to

identify comparator areas that were also significantly deprived. The 39 variables listed in Appendix 5 therefore included measures of area deprivation across 4 domains (Housing, Access, Employment and Health) and also population characteristics in order to match areas on the demographic composition of their populations, thus increasing the ability to make accurate comparisons. The deprivation measures include items used in well-known deprivation scores such as the Carstairs and Morris Scottish deprivation score (Carstairs and Morris 1991) (e.g. Overcrowding, Male unemployment, Social Class IV or V, No car). Thus, the purpose of choosing these variables was to have the areas closely matched on as many dimensions as possible.

The following provides an overview of steps taken to achieve the treatment and comparator groups:

i. First 39 1991 census variables were extracted from CASWEB, a resource based at the University of Manchester that allows the downloading of aggregate UK census statistics and digital boundary data developed by the Census Dissemination (http://casweb.mimas.ac.uk/). These variables were chosen for their association with treatment decisions and outcomes. The full list of variables can be viewed in Appendix 5.

ii. These 39 variables were aggregated into the CATTs system.

iii. Logit regression was conducted to estimate propensity scores.

iv. The comparator areas were then created using the PSMATCH2 facility in STATA 10.1.

Three types of comparator areas with differing geographical characteristics were created with the aim of assessing the strengths and weaknesses of different matching criteria. All three sets were created using the 'nearest neighbour' matching technique with caliper. Care was taken to ensure that the comparator areas were not included in the SARP areas, and to the best of our knowledge, they were not included in any other area-based-initiatives in the past. The nearest neighbour matching technique randomly sorted the treatment and potential comparator CATTs before the first treatment CATT was chosen to find its closest control match based on the value of the difference of the logit of the propensity score of the selected treatment and the comparator under consideration (Coca Peraillon 2006). The closest comparator CATT was then selected as a match. This process (which is then repeated for all the treatment CATTs) made sure that each treated CATT found a match even if the propensity scores are not close provided there are enough comparators available. In the nearest neighbour matching a caliper was imposed whereby treatment and comparator CATTs

were only matched if the comparator's propensity score is within a certain radius. There is no uniformly agreed upon definition of what constitutes a maximal acceptable distance for a caliper (Austin 2011), in this case one fourth of the standard deviation of logit of the propensity scores was used for the caliper radius, which has been suggested in Guo (2005). Consequently, use of the caliper method means that a treated CATT may not be matched to a comparator as the aim is to avoid poor matching.

The following table shows the central features of the three comparator CATTs:

Table 3-2 Characteristics of the comparator groups

Comparator Group	Matching Type	Conditions
1st Set	One to One Nearest Neighbour	With grid references (X,Y) as co-variates, which favours areas close to regeneration areas.
2nd Set	One to One Nearest Neighbour	Without grid references (X,Y) co-variates, geographical location is not taken into account.
3rd Set	One to One Nearest Neighbour	Without grid references (X,Y), excluding CATTS contiguous to regeneration CATTs

These 3 sets of comparator areas were then checked using t test to compare with the regenerated CATTs based on the 39 census variables in order to ensure that they were well balanced with the treatment areas on all variables (i.e. no significant difference on any of the 1991 census variables between treated and comparator areas). The results of this balancing can be viewed in Appendix 5.1 and show that regeneration and comparator residents were balanced on all characteristics. In order to determine which set of comparator areas should be used in the main analyses, three issues were reviewed. First, the issue of location in the same local authority area suggested by Cotterill et al. (2008). The 1st set of comparators are based on criteria that favour areas proximate to the regeneration area (Table 3-2) and therefore most closely accord with this suggestion. However, as was seen in Figure 3-3 above, the SARP areas are mostly concentrated in the Central Belt of Scotland where the majority of the population resides. Arguable, SARP areas in other parts of Scotland (such as in Aberdeen and Dundee) have more in common with the kind of deprivation found in the Central Belt rather than with more proximate areas. It was therefore felt that location in the same local authority area was less important than other criteria. Second, the possibility of ignoring geographical

location was considered. The 2nd set of comparator areas generated took no account at all of location. However this was considered unsatisfactory due to the fact that there was potential for these comparator areas to be located contiguously to regeneration areas, which therefore leads to the third issue of 'spill-over effects'. For example, Gutierrez-Romero and Noble (2009) noted that the implementation area regeneration policies at the small area level can impact on households not directly participating in the programme due to spill over effects. They argued that these effects are likely to occur when the involvement of residents in regeneration activities enhances social networks, creating links between both participants in regeneration activities and non-participants. Any comparator area affected by spill-over would confound the quasi-experimental analysis because this area will have a chance of its residents having received some benefit from the programme, thus confounding the attempt to ascertain what would have happened in the absence of the initiative. It was therefore concluded that the avoidance of such confounding would be the prime criteria for choosing comparator areas. Thus, the 3rd set of comparators excludes areas geographically contiguous to regeneration areas, which ensures they the selected comparators are unlikely to be affected by spill-over effects. This issue was not addressed in the definition of either the 1st or 2nd set of comparators. It was therefore decided that, on balance, selecting the 3rd set of comparators was a sensible approach in that they are not contiguous to regeneration areas and thus control for any potential spill-over effects from regeneration areas into comparator areas. Whilst this choice does not guarantee that comparator areas are in the same local authority, the geographical distribution of deprivation in Scotland means that most will be in the Central Belt. In addition the SARP programmes were national level policies with the same aims and objectives in each region. Thus it is the author's contention that controlling for possible spill over effects was the most important issue in regards to selecting counterfactual areas for this analysis. Once the 3rd set of comparators was selected, the treatment and comparator areas were attached to the individual-level data from the Scottish Longitudinal Study (SLS) in preparation for the main analyses.

The following table (Table 2) shows the number of individuals resident in regeneration areas, the 3rd set of comparator areas and the rest of Scotland in 1991 and 2001:

Table 3-3 SLS Sample Members by Area

	1991		**2001**	
Variable	**Frequency**	**%**	**Frequency**	**%**
Regeneration Areas	39,622	14.64	36,868	13.86
3rd set of Comparator Areas	28,529	10.54	25,287	9.51
Rest of Scotland	202,530	74.62	203,860	76.63

Section 3.6 Outcome variables

Four key outcome variables were employed in the analyses in order to examine the effects of SARPs on health and well-being. Two of these variables (LLTI and unemployment) were from the census, one (Mortality) was from vital registration data, and one (hospital admissions) was from Information data held by Services Division of NHS Scotland. Full descriptions of the rationale behind using these outcome variables are presented in the ensuing empirical chapters. Here in this section a brief overview will be provided.

- **Limiting Long Term Illness (LLTI)**

Limiting Long Term Illness was included as a self-report measure of morbidity. It is defined as a long-term illness, health problem or disability which limits a person's daily activities or the work that they can do, including problems that are due to old age (Cohen et al. 1995). This health indicator was included among the compulsory indicators to be targeted for improvement by the SARP programmes and was monitored via a (largely unsuccessful) process of resident surveys in the official evaluation process reported by Tyler et al. (2001).

- **Unemployment**

We have seen from the conceptual framework in Chapter 2 that unemployment is a determinant of health rather than itself being a health outcome. It is therefore conceptualised as such in this thesis in that it is interpreted as an indirect indicator of (poor) health and well-being. Not only does the extant literature on the effects of unemployment indicate a strong association with poor health and well-being outcomes (e.g. Dahlgren and Whitehead 1991; Kearns et al. 2009) but unemployment was also monitored in the official evaluation process of the SARP programmes (Tyler et al. 2001). However in this evaluation only the RP and SIP areas were included and within these, data was only collected in three areas. Furthermore, unemployment is an important outcome to analyse as the SARP programmes comprised key initiatives designed to tackle worklessness.

- **Hospital admissions**

Hospital admissions was included as an outcome variable in order to provide a clinical measure of morbidity that can be compared with the self-reported LLTI outcome investigated above. Like self-reported rates of LLTI, hospital admissions have been found to be higher in disadvantaged areas. Reducing preventable and unscheduled hospital admissions for residents was not an explicitly stated aim of the SARP programme however it would be expected that efforts to reduce rates of LLTI would impact to some extent on rates of admissions given the correlation between the two outcomes.

- **Mortality**

Results from previous studies illustrated a mixed picture on mortality impacts associated with area regeneration programmes. In regards to the SARP programmes no study to date has been conducted to investigate how these programmes influenced mortality levels in disadvantaged areas. Mortality was not stated as a core indicator to be monitored in the unsuccessful official SARP evaluation effort (Tyler et al. 2001). Nevertheless, given that neighbourhood conditions have been found to have an independent effect on overall mortality (Kearns 2004) mortality was chosen here as an outcome variable to provide insight into the impact of the SARP programmes on mortality and contribute to the wider evidence base on impacts of area regeneration programmes generally on mortality.

- **Mental health data enquiries**

It should also be noted that an attempt was made to incorporate mental health outcomes into the analysis given that previous research has found that these outcomes may respond quicker than other outcomes following a process of area regeneration (Kearns et al. 2009). The intended strategy was to undertake an ecological analysis of count data for mental health (anxiolytics) prescriptions data for the region of Fife at Output Area or Data zone levels of geography. The researcher was made aware that this data was available from the Health Informatics Centre at the University of Dundee, however following enquiries it was discovered that data collection for this indicator began in 2008 which was after the SARP programme had ended. Nevertheless the researcher also approached the Information services Division (ISD) of the NHS to enquire whether long-term mental health prescribing data was available, however again it was not possible to obtain this data at an appropriate level of geography resulting in the abandonment of the plan to assess mental health outcomes in SARP areas.

Section 3.7 Independent variables

The thesis conceptual framework (outlined in Chapter 2) demonstrates that area regeneration programmes attempt to induce change in health and well-being outcomes by developing economic, social and physical initiatives that are intended to impact positively on the determinants of health and well-being at both the individual and community levels.

With this in mind, a range of variables available from the SLS that represented direct or indirect indicators of the determinants of health and well-being (outlined in the conceptual framework) were chosen to be employed in the statistical analyses as independent variables. These variables therefore represented characteristics thought to be important in explaining changes on the outcome variables over the study period.

For example, at the individual level, educational qualifications and employment status were identified in the conceptual framework as key determinants of health that (primarily) economic initiatives attempts to target through supply side initiatives to improve the employability of residents in disadvantaged areas. Individuals with low educational qualifications have been found to be more likely to suffer from ill health than those with good qualifications (e.g. Stafford et al. 2008), whilst those from higher social classes and who have greater incomes have routinely been found to be more likely to be in better health than those from lower social classes who have small incomes (BMA 2011). Variables on qualifications, social class and economic status were available from the SLS and were therefore chosen for use in this study as independent variables which can influence health and well-being outcomes.

Issues around housing may also affect the likelihood of improvement in health and well-being outcomes. The conceptual framework identified housing as a determinant of health that physical regeneration initiatives can have an impact on by improving existing housing stock and building new better quality housing. With that said, the SLS allowed the inclusion of four independent variables pertaining to housing that were included in the statistical analyses. For example, whether individuals have central heating or not was included as an independent variable. Poor housing is associated with adverse health outcomes such as respiratory problems (Thomson 2006). Thus, central heating is a key housing issue as maintaining warmth during the winter months is more difficult and expensive if households lack central heating.

A variable on housing tenure was also available from the SLS and included as an independent variable. Previous research (e.g. Macintyre et al. 2000) has found that those who rent social housing are more likely to be in worse health than private renters due to exposure to stressors such as perceptions of stigma and low prestige, whilst exposure to undesirable neighbours, poor quality of dwelling and remoteness of landlords further compound these ill effects for residents of social rented property compared to those in privately rented accommodation.

Furthermore, a variable on household type was also available from the SLS and included as an independent variable. This variable was included as for example, lone parents to be more likely to experience poor health than other household types such as couples without dependent children by virtue of a higher likelihood of being unemployed (Begum 2004). Thus in this way household type may be considered a determinant of health and well-being that relates to housing as a general health determinant.

An SLS variable detailing whether residents live alone or not was also included as an independent variable related to housing. Social isolation is known to damage health and well-being and is experienced more by those who live alone, particularly older people (Blane 1985). Thus this variable was chosen for inclusion as an independent variable as it can have a key impact on the likelihood of an individual experiencing improved health. For example, housing regeneration initiatives such as the demolishing of flats and the building of low rise accommodation may facilitate increased social networks for isolated residents. However, conversely housing renewal may compound or cause social isolation if it involves the decanting of residents to areas for long periods of time and thus disrupting social networks.

The other individual variables employed in the statistical analyses (e.g. age, sex, marital status, ethnicity and car ownership) are characteristics that regeneration programmes cannot attempt to directly influence. Thus their inclusion is not influenced by the thesis conceptual framework; rather they are included as each of these characteristics has an influence on the health and well-being of an individual. For example, we know that older people are more likely to be ill compared with younger individuals, whilst in addition women generally live longer than men. Marital status can also predict health status as married individuals have routinely been found to be more likely to be healthy than non-married people (e.g. Asthana and Halliday 2006). Furthermore those individuals belonging to ethnic minorities have also been found to be more likely to be in poorer health than non-ethnic minorities in the UK (e.g. Nazroo 1997). Lastly car ownership is also a known predictor of physical ill health. For example Wiggins et al. (2002) found that car ownership were useful markers of social and material advantage that protected against the risk of reporting long term illness. Thus each of these individual-level variables were available from the SLS and included in the statistical analyses as independent variables.

The bearing that these variables may have in relation to each outcome variable is discussed in more detail in the results sections of the following empirical analysis chapters.

Other determinants of health and well-being that were included in the conceptual framework were not captured (directly or indirectly) by SLS variables for use as independent variables in the statistical analyses. For example, there were no SLS variables available that could act as direct or indirect indicators of physical activity and diet as a determinant of health. Nevertheless, the qualitative phase of this thesis aimed to ascertain whether the SARP programmes improved these aspects of resident's lives.

In addition, no variables available from the SLS could act as direct indicators of community level determinants of health and well-being such as access to health services, leisure facilities and the general appearance of the area. These determinants of health and well-being are nevertheless focused on in the qualitative phase of this thesis. However, the other community level determinant of health outlined in the conceptual framework – population retention- was an aspect that could be focused on with SLS data that follows the movements of individuals over time. SLS migration data can also be viewed as a proxy for understanding how regeneration impacted on residents' perceptions of the appearance of the regeneration area. For example if those who remain in the areas over time are more likely to be healthy than those who move out then this can perhaps be attributed to improvements in the physical appeal of the area. Furthermore, if those who move in to regeneration areas are more likely to be healthy than those who move out, then similar inferences could be drawn.

Thus, migration was included as an independent variable that can be viewed as an indirect indicator of population retention. However unlike the other independent variables outlined above, this independent variable forms a central part of the quantitative analysis in this thesis, which investigates the 'moving escalator' effect described in Chapter 2, that asks whether those who have their health and socio-economic outcomes improved through regeneration initiatives, move out to areas perceived as being 'better off'. A full description of how this independent variable was used in a selective migration analysis is found in Chapter 4.

Table 3-4 Summary of all variables included in the research

Variable	Category	SARP Areas				Comparator Areas			
		1991		2001		1991		2001	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
LLTI	Yes	4,286	15.73	5,594	23.13	2,879	16.85	3,566	25.28
	No	22,960	84.27	18,591	76.87	14,212	83.15	10,541	74.72
Hospital Admission	Yes	7,644	28.31	7,379	28.89	4,827	28.5	4,515	30.18
	No	19,360	71.69	18,160	71	12,112	71.5	10,446	69.82
Employed	Yes	10,536	83.89	9,465	90.96	6,353	83.2	5,215	90.43
	No	2,024	16.11	941	9.04	1,283	16.8	552	9.57
Mortality	Yes	888	3.26	894	3.23	559	96.73	568	2.97
	No	26,358	96.74	26,745	96.77	16,532	3.27	18,581	97.03
Age	Mean	46.3		47.8		48.6		45.7	
Sex	Male (reference)	12,898	47.34	12,084	47.2	8,115	47.48	7,029	7,963
	Female	14,348	52.66	13,515	52.8	8,976	52.52	46.89	53.11
Marital Status	Single (reference)	11,882	43.61	12,026	47.62	7,438	43.52	6,922	46.85
	Married	11,773	43.21	9,728	38.52	7,351	43.01	5,598	37.89
	Widowed	1,481	5.44	1,776	7.03	972	5.69	1,109	7.51
	Divorced	2,110	7.74	1,723	6.82	1,330	7.78	1,145	7.75
Social Class	Professional (reference)	331	1.21	474	1.85	155	0.91	221	1.47
	Managerial	2,715	9.96	3,483	13.61	1,308	7.65	1,645	10.97
	Skilled and non-manual	3,222	11.83	3,816	14.91	2,041	11.94	2,149	14.33
	Skilled-manual	3,733	13.7	3,281	12.82	2,453	14.35	2,047	13.65
	Partly-skilled	3,183	11.68	3,591	14.03	2,161	12.64	2,148	14.33
	Unskilled	1,603	5.88	1,528	5.97	1,082	6.33	1,090	7.27
	Never worked	12,459	45.73	9,426	36.82	7,891	46.17	5,692	37.97
Economic Status	In full-time employment (reference)	7,877	28.91	6,918	27.02	4,679	27.38	3,791	25.29
	In part-time employment	2,031	7.45	1,872	7.31	1,330	7.78	1,087	7.25
	Self-employed	628	2.3	675	2.64	344	2.01	337	2.25
	Unemployed	2,024	7.43	941	3.68	1,283	7.51	552	3.68
	Student	6,483	23.79	6,456	25.22	4,034	23.6	3,636	24.25
	Permanently sick	1,607	5.9	1,876	7.33	1,104	6.46	1,207	8.05
	Retired	3,954	14.51	3,691	14.42	2,526	14.78	2,441	16.28
	Other inactive	2,642	9.7	3,170	12.38	1,791	10.48	1,941	12.95

Qualifications	No qualification and NCR Persons under 18 (reference)	23,123	84.87	19,207	75.03	14,813	86.67	11,504	76.73
	Sub-degree	947	3.48	1,149	4.49	456	2.67	625	4.17
	Degree and higher degree	687	2.52	2,369	9.25	310	1.81	1,035	6.9
	Not stated	923	3.39	1,338	5.23	589	3.45	858	5.72
	Over 75 with qualification	1,566	5.75	1,536	6	923	5.4	970	6.47
Ethnicity	White (reference)	26,943	98.89	24,541	98.15	16,938	99.1	14,391	98.19
	Non-white	303	1.11	462	1.85	153	0.9	266	1.81
House Tenure	Owner occupied (reference)	10,583	38.84	13,552	54.78	5,561	32.54	7,031	48.7
	Social renting	15,525	56.98	8,947	36.16	10,961	64.13	6,348	43.97
	Private renting	1,138	4.18	2,241	9.06	569	3.33	1,059	7.33
Central Heating	Central heating (reference)	20,538	75.38	23,399	93.28	12,513	73.21	13,619	92.76
	No central heating	6,708	24.62	1,686	6.72	4,578	26.79	1,063	7.24
Persons living in the dwelling	Living alone	3,579	13.14	4,398	17.18	2,169	12.69	2,665	17.78
	Not living alone (reference)	23,667	86.86	21,201	82.82	14,922	87.31	12,327	82.22
Car ownership	0 cars (reference)	13,589	49.88	9,531	37.23	8,940	52.31	5,953	39.71
	1 cars	10,425	38.26	10,552	41.22	6,591	38.56	6,415	42.79
	2 cars	2,744	10.07	4,076	15.92	1,326	7.76	1,903	12.69
	3 cars	488	1.79	800	3.13	234	1.37	336	2.24
Household type	Married and unmarried couples with no dependent children (reference)	2,348	19.47	4,270	29.37	1,392	18.9	2,429	29.73
	Unmarried adult	3,345	27.74	5,295	36.42	2,051	27.85	2,977	36.44
	One parent families with dependent children	756	6.27	1,123	7.72	485	6.59	684	8.37
	Married and unmarried couples with dependent children	3,628	30.09	3,758	25.85	2,236	30.36	2,029	24.83

Having outlined the data sources and variables that I have used, I will now move on to discuss the specific methods employed in the analysis.

Section 3.8 Statistical analysis strategy and techniques employed

The statistical analyses were conducted in three distinct and sequential stages in order to enhance the rigour of the work. The first stage involved a repeated cross-sectional area change analysis that moves beyond a purely ecological approach by investigating change in the outcome variables over time for regeneration area residents when compared with comparator area residents. If the SARP

programme has been successful in improving resident's health and well-being, we would expect that, by 2001, those individuals resident in regeneration areas would have experienced better health and well-being outcomes compared with individuals' resident in comparator areas. However, as was found in Chapter 2, people may move out of regeneration areas once they have benefitted in some way from the programme, which can obscure the true impact of the programme for residents. The repeated cross-sectional analysis was therefore conducted to obtain an initial base level understanding of the impact of the SARP programmes which would allow direct comparison with further more sophisticated longitudinal stages that do account for migration. Thus, the second stage of the statistical analysis focuses on selective migration in regeneration and comparator areas and builds on the cross sectional comparison by accounting for the fact that neighbourhood populations are rarely static. Here the movements of residents into and out of regeneration and comparator areas are tracked to compare outcomes over time for different migrant groups:

- those who have lived in regeneration areas throughout the study period ('remainers')
- those who lived in such areas in 1991 but had left by 2001 ('out-movers')
- those who were living somewhere else in 1991 but had moved into a regeneration area by 2001 ('in-movers').

In addition, outcomes for three similar groups living in significantly deprived areas in Scotland that did not experience regeneration between 1991 and 2001 are compared in order to identify effects that cannot be ascribed to regeneration and thus to draw some broad conclusions about the effects of the regeneration process in Scotland.

The final stage of the analysis further extends the investigation by using a Difference in Differences (DiD) approach. This analysis is carried out to compare the difference in likelihood of health and well-being outcomes in the treated group before and after the regeneration programme with that in the comparator group, and therefore takes the changes occurring both in the treated and comparator groups into account. In this case we expect that even without the regeneration programme, there would be changes in the outcomes for residents in both treated and comparator areas between 1991 and 2001, reflecting national-level changes. Thus by using the DiD I aim to identify whether the SARP programme has any net effects on residents in the treated group. The difference in differences approach attempts to mimic random assignment with a treatment and comparison sample. In its simplest form the approach involves observing outcomes for two groups for two time periods. One of the groups is exposed to a treatment in the second period but not the first, whilst the second group is not exposed to the treatment during either period. In the case where the same units within a group are observed in each time period, the average gain in the second

(control) group is subtracted from the average gain in the first (treatment) group (Imbens and Wooldridge 2007). This therefore removes biases in second period comparisons between the treatment and control group that could be the result from permanent differences between these groups, as well as biases from comparisons over time in the treatment group that could be the result of trends.

The following sub-section details the specific modelling techniques used in each of the three sections.

Section 3.8.1 Binary logistic regression

Binary logistic regression was used for repeated cross sectional analyses using the unemployment, LLTI and hospital admissions outcomes and for selective migration analyses. This form of regression modelling is employed when the dependent variable is a dichotomous. In this case all dependent outcome variables were binary, (e.g. unemployed or not unemployed, has LLTI or does not have LLTI etc.). Logistic regression can therefore be used to estimate the probability of an event occurring conditional of independent variables by applying maximum likelihood estimation after transforming the dependent into a logit variable (the natural log of the odds of the dependent occurring or not) (Hosmer and Lemeshow, 2000). Logistic regression modelling requires that observations are independent and that the independent variables be linearly related to the logit of the dependent. The success of the logistic regression can be assessed by looking at the classification table, showing correct and incorrect classifications of the dichotomous dependent. Also, goodness-of-fit tests such as model chi-square are available as indicators of model appropriateness as is the Wald statistic to test the significance of individual independent variables (Garson 2008). In regards to interpreting the odds ratios generated by a logistic regression, an odds ratio of 1 indicates that the probabilities of an event occurring are equal in the two groups. An odds ratio greater than 1 indicates the probability of an event occurring is higher in the group of interest than that in the reference group, whilst furthermore, an odds ratio less than 1 indicates the probability of an event occurring is higher in the reference group. (Hosmer and Lemeshow, 2000) All binary logistic regression models in the analysis for this research were implemented using STATA 11.0.

Section 3.8.2 Poisson regression

Poisson regression models were fitted to investigate incidence rate ratios for mortality between regeneration and comparator areas. The mortality events investigated here were drawn from vital events registry data that is available to users of the SLS and is linked from 1991 up to 2004. Poisson regression is used to model count variables, particularly low count variables (Scott and Marshall

2005) and measures relationships between mortality and independent variables with person-years as exposure (Preston 2005). Poisson regression usually requires a large sample size, (such as that used in this thesis with the SLS) and is used when count outcomes are discrete and violate the assumptions of Ordinary Least Squares regression in that the outcomes are not continuous and may not have a bell-shaped distribution (Scott and Marshall 2005). According to (Greene 2003) there are four main assumptions associated with poisson regression. Firstly, that the logarithm of the disease rate changes linearly with equal increment increasing in the exposure variable. Secondly that changes in the rate from combined effects of different exposures or risk factors are multiplicative. Thirdly that at each level of the covariates the number of cases has variance equal to the mean, and fourthly that observations are independent. In poisson regression rates are assumed to be constant within covariate patterns and estimates of rates and rate ratios are taken (Juul and Frydenberg 2010). In this case, I used poisson regression models in Stata 11.0 to generate the Incidence Risk Ratio (IRR) of mortality events in SARP area relative to comparator areas. The IRR is derived from calculating the incidence rate for the regeneration area residents divided by the incidence rate for the comparators and is interpreted in a similar fashion to the odds ratio generated by a logistic regression (Juul and Frydenberg 2010).

Section 3.8.3 Conditional fixed effects regression

The DiD analysis for was undertaken using the conditional fixed-effects logistic regression to model the net impact of the SARP programmes on Limiting Long Term Illness, Hospital Admissions and Unemployment. A common method to improve the efficiency of the DiD technique is to use a regression model, in which control for variables such as marital status and social class can be used to measure the observed characteristics of individuals over the study time period. Thus, a regression model can facilitate understanding of differences in characteristics between treatment and comparator groups which in turn improves the efficiency of estimates (Gutierrez-Romero and Noble 2008). This model differs from regular logistic regressions in the sense that the data are grouped as each individual has more than one observation over time, and unlike logistic regressions the likelihood is calculated relative to each group (Gutierrez-Romero and Noble 2008). According to Allison (2006), the successful implementation of the conditional effects model is contingent upon two basic data requirements. Firstly that for each individual the dependent variable must be measured, using measurements with directly comparable meanings and metrics, on at least two occasions. Secondly, that predictor variables of interest must change in value across the two occasions for some substantial portion of the sample as fixed effects methods are not appropriate for estimating the effects of variables that don't change over time, like race and sex (Allison 2006).

Thus in this case only the time-variant explanatory variables were included in the DiD analyses. The conditional fixed-effects logistic model therefore facilitated the analysis of information for each individual over time and compare the changes in likelihood of being unemployed, being admitted to hospital or having a LLTI in SARP areas relative to matched comparator areas.

The following sections will now discuss all aspects involved with the design and implementation of phase 2 of the research.

Section 3.9 Phase 2: Experiences of SARP area regeneration

The objective of Phase 2 was to explore how the programme was practically implemented and to ascertain how it impacted on the lives of residents, specifically in order to shed light on the quantitative results. The quantitative modelling was unable to shed light on aspects that may have impacted on the results such as problems that may have occurred in the roll-out of the programme in particular areas or the level of engagement that residents had with the programme. Thus, in order to obtain a micro-level of understanding of issues such as these it was decided that the collection of qualitative data was appropriate.

Section 3.9.1 Area selection strategy

The selection of the study area for Phase 2 was undertaken in consultation with the stakeholder organisations involved in funding the project; Fife Council and NHS Fife. Initially the researcher held meetings with Fife Council locality managers in several former SARP areas specifically in order to ascertain whether key informants who were involved in all stages of the implementation of the initiatives were contactable for interview. Following this process, Parkhill (pseudonym) was chosen as the an area where it was possible to contact the locality managers that were in place in that area throughout the full period of both SARP programmes the area experienced; the Regeneration Partnership programme (RP) and the Social Inclusion Partnership programme (SIP).

Section 3.9.2 Participant selection strategy

- **Key informants**

Participants were identified purposively from the above stated discussions with the current locality manager in the Parkhill area and from meetings with Fife Council staff involved in co-supervising this study. Patton (2000: 40) stated that purposive sampling involves selecting participants who are information rich and have a direct experience of the subject under study and with that said, prospective key informants were approached after being identified as being involved in the practical implementation of either of the SARP programmes. Seven key informants were identified and targeted from the discussions outlined above, however due to two individuals being unavailable over the study period only five of these individuals were recruited. Table 3-5 below provides a brief overview of the key informants: the table below:

Table 3-5: Overview of the key informants, n=5

Name (pseudonym)	**Occupation at time of the SARP programmes**
Steven	Locality manager and Regeneration Manager in SIP phase
Debbie	Health Promotion Officer in RP and SIP phase
Pat	Locality Manager in RP phase
Julie	Community Warden in SIP phase
John	Housing officer in RP and SIP phase

- **Residents**

Purposive snowball sampling was used to recruit participants who had experience of living in Parkhill throughout both of (or either) the RP and SIP phases of the SARP programme. Initial contact with a prospective participant came as the result of a key informant (Julie) putting the researcher in touch

with a resident well-known to the key informant who had expressed interest in the study. Once the initial interview was completed the researcher asked the participant if she knew of anyone else with experience of the programme who may be interested in taking part. From this point ten other interviews with residents took place until data saturation was achieved. Initially the researcher had targeted the recruitment of residents who were involved in decanting processes as part of the housing renewal element of the programme; however the local authority did not keep records on the current addresses of such individuals. Attempts were made to make contact with these residents via snowball methods, however these were ultimately unsuccessful. The table below provides an overview of the residents who participated in the Phase 2 of the research.

Table 3-6 Overview of the residents, n=11

Name (pseudonym)	**Age**	**Sex**	**Phases of programme experienced**	**Occupation**
Harry	50	Male	RP and SIP	Shop worker
Margaret	64	Female	RP and SIP	Shop worker
Charlie	39	Male	RP and SIP	Shop worker
Ryan	45	Male	RP and SIP	Permanently sick
Flora	41	Female	RP and SIP	Shop worker
Kara	22	Female	SIP	Student
Cheryl	55	Female	RP and SIP	Retired
Thomas	33	Male	RP and SIP	HGV driver
Brian	33	Male	RP and SIP	Community worker
Roy	51	Male	RP and SIP	Council worker
Greg	29	Male	RP and SIP	Student

Section 3.9.3 The interview guide

Two interview guides were developed from points that arose from the literature review chapter. A guide for the interviews with key informants focused on opinions and experiences around how the programme was implemented whilst the guide for residents focused on attempting to elicit personal views, attitudes and expectation that residents' had towards the SARP programmes. The interview guides were structured in such a way that the questions followed chronologically from past, present and future contexts. This was carried out in order to ascertain the feelings of both residents and key informants before the programme was implemented, their feelings during the implementation

phase, their feelings presently and to ascertain their feelings on how they felt the area would fair in the future. Both interview guides can be viewed in Appendices 4 and 4.1.

Section 3.9.4 Qualitative data collection methods: Semi – Structured Interviews

Semi – structured interviews were deemed by the researcher to be the most appropriate and useful method to be employed here. Firstly, given the nature of the strategy devised to access individual experiences of the regeneration programme, it was theorised that, in the case of the interviews with residents, a face- to- face interview would be more appropriate than a focus group for example, as in a group setting certain individuals may feel disinclined to discuss personal memories and the emotions associated with them. Smith (1995) acknowledged this by stating that individual face- to – face interviews are particularly useful when investigating areas, which are controversial or personal (p.10). In regards to the key informants, again semi-structured interviews were deemed to be the most appropriate method of data collection. Focus groups were considered in this case; however it was felt that one-to-one interviews would allow for a greater depth of account from each key informant.

The idea of a 'semi'- structured approach differs from that of a structured or an unstructured approach in that it attempts to sit between them by using an interview schedule to cover identified aspects of enquiry whilst also allowing the researcher to ask participants to elaborate and clarify an aspect of inquiry through the use of probes. Therefore a semi- structured interview is neither open – ended nor arranged around fixed questions and thus allows freedom for the researcher to explore areas of interest whilst also having the control of having identified aspects to be covered in the interview.

Semi- structured interviews are described by May (2001:123) as sitting 'between the focused and structured method' of data collection by interviewing. The use of semi- structured interviews requires the researcher to generate an interview schedule which covers all aspects of their enquiry while at the same time allows one to seek 'clarification' and 'elaboration' of the topic under discussion through the use of 'probes' (May 2001:123). Therefore should a participant raise a topic, which seems helpful in the exploration of the study aims, the researcher is free to pursue that line of enquiry and the information collected may be legitimately used within the resulting analysis.

The potential for participants to shape the nature of the interview is thought, to some extent, to reduce the potential for detrimental power relationships within the interview setting by allowing the participant some element of control. However, Tones and Tilford (2000:160) describe this as rhetoric and contend that interviews can lead to exploitation' of weaker people who may feel obliged in this

situation to disclose facts about themselves or behaviours which they would normally keep to themselves. However, it is reasonable to assume that allowing some influence to remain with the interviewee will generate data that reflects their interests and concerns.

The researcher identified probing questions to be used in the interview guide from the literature review chapter (Chapter 2). These probing questions informed what types of topics were to be covered over the course of each semi- structured interview through incorporating Lofland and Lofland's (1995) notion of 'thinking topics'. These are described as the units and aspects of social settings (p.101). Therefore, in order to conduct detailed inquiry of a social setting we need to establish a focus on topics that are encompassed within the society to gain a more elaborated or refined idea of a social setting.

Five types of topic were identified by the researcher (from Lofland and Lofland 1995:101) as being relevant to the aims of this study. These were, **Episodes**: relating to times that were remarkable or dramatic to the participants; **Encounters**: when two or more persons are in one another's immediate physical presence and strive to maintain a single (ordinarily spoken) focus of mutual involvement; **Relationships**: Two parties who interact with some regularity over a relatively extended period of time; **Roles**: consciously abstracted and articulated categories of social 'types of person'; **Lifestyles/ Subcultures**: global adjustments to life by large numbers of similarly situated persons. These types of topic were thought by the researcher to be of interest in participant's accounts of their experiences pertaining to the regeneration programme in the study area.

Section 3.9.5 Qualitative data analysis

The qualitative phase had a narrow focus and remit which pertained to exploring how the programme was practically implemented and to ascertaining how it impacted on the lives of residents, in order to shed light on the quantitative results.

Data produced from the interviews were analysed using a data driven thematic analysis as discussed by Joffe and Yardley (2003), who described a theme as a specific pattern found in the data in which one is interested. Boyatzis (1998) expanded upon this slightly by stating that a theme is described as a pattern found in the information that, at minimum, describes and organises the possible observation and, at maximum, interprets aspects of the phenomenon. To enable a thematic analysis all interviews were recorded on a Dictaphone and then transcribed by the researcher to enable a familiarisation with the data.

These issues were identified as *a priori* themes stemming from the information presented in Chapter 2:

1. The facilitators and barriers to successful programme implementation
2. The programme's influence on population turnover
3. Residents' perceptions of the programme and engagement with initiatives

The first and third issues were included in the thesis conceptual framework as intermediate issues that can affect health and well-being outcomes given that the success of a programme may depend heavily on both effective implementation and community engagement. The second issue was also alluded to in the conceptual framework as an area-level determinant related to the success of the programme and thus its ability to impact positively on health and well-being given that previous work such as that by Cole et al. (2007) has postulated that those who 'get –on' through the programme may move away to more affluent areas. In addition, the previous chapter theorised that population turnover can potentially damage mental health (for older people in particular) through the disruption of established social networks. These issues were incorporated into the interview guide.

In order to develop a thematic index, the researcher coded the interview data line by line for content and meaning and categorised these according to whether the data corresponded to the *a priori* themes or whether they appeared to represent emergent themes unconnected to the *a priori* themes. After undertaking this process for all interviews, the data were then imported into NVivo9 Framework Matrices for comparison of the *a priori* and emergent themes. Framework matrices were used to facilitate the application of the constant comparative method to search for patterns, relationships. The researcher decided that all three *a priori* themes were broadly supported by the data. A fourth emergent theme was found pertaining to the accounts of both residents and key informants regarding what factors were involved in causing the decline of the area. Thus, in light of this thematic analysis, four central themes were identified:

Accounts of area decline: setting the scene – which discusses residents' and key informant recollections of the area prior to the implementation of the SARP programmes in order to set the scene for the remainder of the discussion. **The importance of the area regeneration partnership** – which describes the challenges faced by those implementing the programme. **Regeneration-induced population turnover in practice**– which discusses how elements of the regeneration programme impacted on population turnover. **Impacts of Physical, Social and Economic Regeneration on health and well-being** – which discusses the impact of the wider holistic regeneration programme on

residents' health and well-being and investigates residents' perceptions of the programme initiatives. Responses on all four themes are then used to enhance understanding of the quantitative results.

Section 4.0 Conclusion

This chapter has presented and discussed the methods employed for investigating the impact that the SARP programmes have had on community health and well-being in Scotland. The chapter has argued that using a mixed- methods approach provides a means by which the analyses can be undertaken at different complimentary scales using abductive reasoning that moves back and forth between induction and deduction (Morgan 2007). Thus, the inductive results from the qualitative approach serve as explanatory inputs to the deductive goals of the prioritised quantitative approach (Morgan 2007). These methods reflect the epistemological basis of the research, which is aligned to the pragmatist research paradigm that argues that social science research, should be conducted using whichever philosophical and/or methodological approach that works best for the particular research problem under study.

Using the data and methods outlined above, the next four chapters will present the results of the empirical analyses. The results from Phase 1 are detailed in Chapters 4, 5 and 6, whilst Chapter 7 presents and discusses the analysis of the qualitative data from Phase 2 and relates these to the quantitative results.

Chapter 4 The Impact of the Scottish Area Regeneration Partnership Programmes on Unemployment

Section 4.1 Introduction

Unemployment is known to have a deleterious impact on mental and physical health (Curtis 2004; Dahlgren and Whitehead 1991), is strongly associated with social exclusion (McCrystal et al. 2000) and has been stated to lie at the root of many social problems in deprived neighbourhoods (Kearns and Forrest 1999). With this in mind, the reduction of unemployment levels in disadvantaged areas was a key aim of the Scottish Area Regeneration Partnership (SARP) programme's economic strategy (McQuaid 2006). In line with the conceptual framework for this thesis stated in Chapter 2, unemployment is conceptualised here as a determinant of health and well-being and investigates whether the SARP initiative succeeded in its aim to reduce the likelihood of unemployment for residents in the regeneration areas.

Here I undertake a Scotland-wide quasi-experimental analysis using a working-age (18-65 years old) sample where the SARP programme is envisaged as the treatment in order to answer the following two research questions: (1) Does living in SARP areas have a positive or negative impact on the likelihood of residents being unemployed compared with residents living in comparator areas that did not receive the programme? (2) Does the likelihood of being unemployed differ across migrant groups who moved into, out of, or remained in SARP treatment areas and comparator areas?

As has been stated earlier in this thesis, the quantitative phase of this study focuses on the 21 SARP areas that originally had Priority Partnership Agreement (PPA) and Regeneration Programme (RP) designation from November 1996 before being subsumed collectively into the Social Inclusion Partnership (SIP) regeneration programme in April 1999 without any revision of boundaries (Taylor 2002). To date, the direct health impacts of the SARP regeneration programmes remain largely unclear (Petticrew et al. 2008). However, in regards to the impacts of this area regeneration programme on socio-economic outcomes such as unemployment, limited evidence does exist. For example, a recent systematic review of the evidence for the effectiveness of UK area regeneration programmes in improving health and reducing health inequalities (Thomson et al. 2006) located one previously conducted evaluation of the SARP programme (Tyler et al. 2001). Whilst being unable to conduct any meaningful analysis on health outcomes due to data limitations, this study reported small but positive impacts on unemployment (3.8% reduction in unemployment and a 32% reduction in numbers of unemployment benefit claimants). However, these positive findings could not be attributed to the impact of the regeneration programme *per se* as these figures were similar to national or regional trends over the same time period (Thomson et al. 2006).

The study by the Tyler et al. therefore represents the best available evidence to date of the impact of the SARP programme on unemployment. However, the study was limited in several important ways. For example, a lack of appropriate data was identified as a key limitation by the authors:

> "As with other schemes, the lack of up to date population estimates is a hindrance in that it prevents a review of the incidence of unemployment, rather than the trends, and makes it difficult to assess whether there has been any narrowing of differentials. The lack of consistent data collection on training activity, and the absence of appropriate denominators, is also a constraint. The data available is typically confined to unemployment and the employment rate (where it can be calculated)." (Tyler et al. 2001:69).

In addition, the study by Tyler et al. concentrated only on the 9 Regeneration Programme (RP) areas that evolved into Social Inclusion Partnership (SIP) areas in 1999, thus excluding the 12 PPA areas from the evaluation. Furthermore, the above mentioned data limitations were responsible for the fact that results regarding employment outcomes could be stated for only 3 of the 9 RP/SIP areas. Additionally, the study did not provide an assessment of the counterfactual, or what would have happened in the absence of the programme. In order to establish the impact of a programme on a person or group, it is necessary to compare the observed outcome with the outcome that would have resulted had that person or group not participated in the programme (Bryson et al. 2003). The Tyler et al. study was also unable to track residents over time, which is important as the resident population in regeneration areas may change substantially over the course of the programme, perhaps due to the effects of the programme itself. For example, a resident who receives training through a regeneration initiative may find a new job bringing an increase in income and subsequently move to a less deprived area. Thus tracking disadvantaged residents through time can more securely relate residents' changing circumstances to the regeneration processes that they experience.

My analysis will attempt to extend and improve upon the Tyler et al's study (2001) in several ways. I extend the previous evaluation by including all 12 PPA areas as well as the 9 RP areas that were initiated in 1996 and converted to SIPs in 1999. It is important to include these PPA areas as to date very little evaluation work has been carried out in regards to the impact of the PPA programme on any domains (Fyfe 2009). In addition, I improve upon the previous evaluation by providing a measure of the counterfactual through the use of comparator areas with similar deprivation profiles to the SARP areas in order to provide an estimation of what would have happened in the absence of the initiative. Further, I use data from the Scottish Longitudinal Study (SLS) to follow resident's movements over time into and out of regeneration and comparator areas. Lastly, the previous evaluation could not attribute decreases in unemployment figures to programme effects beyond national or regional trends. Here I improve upon this by using the Difference in Differences (DiD)

estimator which accounts for national trends in unemployment to identify whether the SARP programme has any net effects on decreasing the likelihood of unemployment for residents in regenerated areas between 1991 and 2001.

The following three sections of this chapter provide an overview of central issues regarding unemployment and how these issues relate to the present research. Section 4.2 discusses the experience of unemployment and its consequences for health and well-being in order to define unemployment and provide more in-depth evidence to support the use of unemployment as an indirect indicator of health and well-being. The next section (4.3) considers the causes and consequences of spatial concentrations of unemployment, the existence of which are a key reason for the development of area-based regeneration strategies. Following this, section 4.4 outlines examples of how area regeneration policy in Scotland has sought to tackle unemployment and details how lessons learned from previous research inform this chapter's empirical analyses. The results of the empirical analysis are then reported in section 4.5, which presents and discuss the research population summary statistics. Section 4.6 presents results from a cross-sectional analysis to ascertain change in likelihood of unemployment over time in regeneration areas compared with comparator areas. A consideration of selective migration movements into and out of regeneration and comparator areas will be presented in section 4.7, whilst a Difference in Differences (DiD) analysis is carried out in section 4.8. The chapter concludes in section 4.9 by discussing the key results in relation to the two research questions set out above.

Section 4.2 The experience of unemployment and its consequences for health and well-being

Elevated levels of worklessness are linked to unfavourable social and economic outcomes and can thus be used to indicate one aspect of area deprivation (ONS 2009). Unemployment, defined as the state of being unable to sell one's labour-power in the labour-market despite being willing to do so (Mayhew 2004), is often used as a measure of worklessness and was a key indicator targeted as part of the SARP programme's economic regeneration strategy (PPA Monitoring and Evaluation Unit 1998). In the UK, official unemployment numbers are calculated using an International Labour Organisation (ILO) definition. This definition describes the unemployed population as all those with no paid work who are available to start work in the next fortnight and who either have been looking for work in the last month or who are waiting to start a job already obtained (Parekh et al. 2010). This can be differentiated from another widely used measure for worklessness, that of the 'economically inactive' population, which is defined as those without a job who have not actively sought work in the last four weeks, and are not available to start work in the next two weeks (ONS

Publication Hub 2009). In this chapter I focus on an investigation of unemployment as opposed to economic inactivity.

The impacts of unemployment can vary by the length of time an individual is out of work and these periods of time spent in unemployment are generally described as being short-term or long- term. Long-term unemployment refers to the number of people with continuous periods of unemployment extending for a year or longer, expressed as a percentage of the total unemployed, whereas short-term unemployment refers to a period of continuous unemployment lasting less than one year (ILO 2011). The length of time a person has been unemployed is known to be strongly associated with their likelihood of getting back into work, which decreases the longer a person is unemployed, especially for older individuals (Gordo 2006).

The experience of short-term unemployment has been found to have negative impacts on health and well-being (Gordo 2006). For example, low-level stress and depression can be felt during periods of short-term unemployment (Stankunas et al. 2006). In addition, Maier et al. (2005) found that both male and female short-term unemployed individuals had suffered a significant decrease in physical working capacity (assessed by bicycle ergometry) and a significant worsening in mental health (assessed by serum cortisol levels and Giessen questionnaire score). However, these indicators of physical working capacity and mental health worsened considerably when the term of unemployment increased beyond 12 months (Maier et al. 2005). Thus, whilst short-term unemployment may induce deterioration in health and well-being, this impact can be more pronounced for the long-term unemployed.

Supporting this finding, others have observed that long-term unemployment can result in the decay of skills, decline of aspirations and self confidence, and also a decline in health (McGregor and McConnachie 1995; Von Wachter 2010). Furthermore, long-term unemployment can also greatly increase feelings and experience of social isolation (Budd et al. 1987). Thus, whilst there has been debate over whether unemployment causes ill health or if ill people are more likely to be unemployed, the evidence suggests that even though ill people are more likely to be unemployed, unemployment in and of itself is bad for one's physical and mental health (Shaw et al. 2001).

This brief discussion has defined the concept of unemployment and provided evidence to demonstrate the negative consequences of unemployment for health and well-being in order to support the use of unemployment as an indirect indicator of health and well-being in this chapter. The following section will consider spatial concentrations of unemployment and the significance of these for this research.

Section 4.3 Area based studies of unemployment

The existence of spatial concentrations of unemployment has been a key reason for the need to develop area-based regeneration strategies (Campbell 2000) such as the SARP programme to tackle heightened levels of unemployment in certain disadvantaged areas. Unemployment is spatially differentiated and, for most of the industrial era, urban unemployment has tended to concentrate in specific neighbourhoods. Indeed, even when unemployment at a national level has fallen steadily, the least employable individuals and those with least access to employment have been found to be concentrated in particular places (MacLennan 2000). Previous research (e.g. Green and Owen 1998; Turok and Edge 1999; Turok 2004) has demonstrated that those places with high concentrations of workless residents are likely to be found within the UK's major conurbations, certain neighbourhoods in cities, and in mining and industrial areas where the number of jobs and employment opportunities have often been in decline since the 1970s as a consequence of de-industrialisation processes and manufacturing decline (Campbell 2000). These places can contain above average rates of economic inactivity and long-term unemployment in people of working age, and average incomes lower than in the rest of the UK (Barnes et al. 2011). Indeed, people in inner city areas, for example, can be disadvantaged in the labour market due to jobs moving to other areas, an issue that is described as 'spatial mismatch' (Kain 1992; Ihlanfeldt and Sjoquist 1998).

Thus, the economic changes associated with area decline can leave many people stranded in one location without work, and whilst some may be able to move from that location, many more cannot or are unwilling to, an issue which can justify the investment in regeneration strategies (Couch et al. 2003).

In Scotland, a clear spatial pattern of social deprivation linked to manufacturing decline was uncovered in the late 1970s and early-to-mid 1990s. For example, Glasgow was found to have the largest concentration of deprivation in Scotland by some considerable margin, which was directly attributable to the city experiencing significant manufacturing and industrial job losses between 1981 and 1991. The overall loss of jobs in Glasgow was more than for the whole of the rest of Scotland put together (Webster 2000). In addition, other Scottish manufacturing centres such as Dundee and the inner Clyde Valley conurbation (covering towns such as Motherwell, Coatbridge, Airdrie, and Greenock) also suffered heavy job losses through deindustrialisation processes, as did former mining areas such as Cumnock and Doon Valley (Webster 2000). Thus, these areas became the focal points for area-based regeneration strategies in Scotland from the 1970s onwards.

An insight into the factors that contributed to spatial concentrations of unemployment in the UK was provided by Turok and Edge (1999) who demonstrated that in the period 1981-1996, for example, half a million manufacturing jobs were lost to de-industrialisation in twenty of the UK's major cities and conurbations whilst the rest of the country gained 1.7 million jobs. Over the longer term (1929 to 2009) Livingston et al. (2010) have shown that manufacturing jobs in general decreased from 7,053,000 to 2,730,000. This considerable job loss was found to have most particularly disadvantaged full-time male manual workers in cities and conurbations and was not offset by growth in (mostly part-time) female employment and the service sector. The impact of manufacturing decline and loss of employment resulted in a large rise in worklessness where tens of thousands of people (mainly men) moved on to sickness benefits, which has helped to disguise the real rate of unemployment in disadvantaged areas suffering from urban job loss (Turok 2004).

This 'hidden' unemployment in disadvantaged neighbourhoods was addressed by Green and Owens's (1998) concept of 'non-employment', which comprises both unemployment and economic inactivity. Green and Owen found that, between 1981 and 1991, the rate of non-employment in inner city and mining/industrial areas was greater than that suggested by unemployment figures alone relative to the rest of the country, whilst also finding that the unemployed in large urban areas were relatively more likely to become economically inactive and on sickness or incapacity benefit than to actually return to work compared with people living elsewhere. Furthermore, the disappearance of low-skilled routes into the labour market in the 1990s had particular consequences for young people trying to gain a foothold in employment (Fevre 2011). Thus, in addition to male workers, younger workers struggled to find a way in to the labour market.

Economic (and social) exclusion was identified as a key concern of the SARP programme, particularly in the SIP phase, where a clear commitment was made to prevent younger people and others such as the non-employed from becoming excluded from the economic and social mainstream (SIP Monitoring and Evaluation Unit 1998; Taylor 2002). In particular, these issues were tackled in the form of education and vocational training programmes, and employment advice (Tyler et al. 2001), whilst in an attempt to address the issue of economic inactivity the SARP programme placed a greater focus on in-work benefits to encourage and enable people to move from non-employment into work (Carley 2001). However, others have argued that job creation should be the primary focus of area-based regeneration as supply-side measures such as education and training alone were not sufficient to deal with spatial concentrations of unemployment when an inadequate demand for

labour and a lack of jobs existed in the cities, conurbations and mining areas (Green and Owen 1998; Turok and Edge 1999).

Nevertheless, a shortfall in skills and educational attainment may indeed play a part in geographical concentrations of unemployment in addition to lack of jobs alone. For example, Campbell (2000) states that gaps in skills and experience among the long-term unemployed may mean that any available jobs will tend to go to the short-term unemployed in areas where jobs growth is slow or declining, advantaging new labour market entrants such as graduates or commuters. The long-term unemployed will therefore face difficulties obtaining work even if the demand for labour overall were to be sufficient to employ them (Campbell 2000), which therefore supports the approach that the SARP programme took to focus on supply-side measures to tackle spatial concentrations of unemployment.

Resident migration out of, and into, disadvantaged areas is a further issue thought to have a bearing on spatial concentrations of unemployment. For example, the persistently high rate of worklessness in disadvantaged areas is linked to the two interrelated processes of (1) transitions into, and out of, worklessness and employment, and (2) geographical migration (Barnes et al. 2011). These two processes are interlinked in that the transition from worklessness into employment for a resident can then often facilitate geographical mobility from the disadvantaged area to another more affluent area. This can become problematic for a deprived area when out-movers are replaced by workless in-movers who may also eventually make the same transition to employment and move out; and so the cycle continues. This process has been termed the 'moving escalator' (Cole et al. 2007) where persistent population churn ensures that the neighbourhood's unemployment profile (and the overall level of deprivation) does not change. As we shall observe in the next section, this issue is also particularly problematic in regards to area-regeneration programmes such as the SARP initiative that seek to improve the employability of non-employed individuals, as these regeneration efforts can merely serve to facilitate and expedite the moving escalator processes.

Research by Bailey and Livingstone (2007), however, has found that disadvantaged neighbourhoods do not suffer from increased rates of residential churn compared to less deprived neighbourhoods *per se*. Instead, compositional factors such as the age-structure of movers and the stage of a household's lifecycle determine household mobility as opposed to neighbourhood type. Indeed, previous research (e.g. Beatty et al. 2009; Kearns and Parkes 2003; Meen et al. 2005; Barnes et al. 2011) found that, in general, out-movers from disadvantaged neighbourhoods have a younger age profile than non-movers. Given that a key aim of the SARP programme was to improve the

employability of younger people excluded from the jobs market, it would appear that by improving life chances for people who are likely to move out after receiving education and training programmes, attempts to improve the deprivation profile of an area may be undermined. However, the overall success of any regeneration effort is dependent on retaining the population in the area (Tarling et al. 1999) by also improving aspects of the physical environment such as housing and green space in order to make the area a more attractive place to live. Thus if a comprehensive regeneration effort has been successful, one may expect the flow of younger, well-qualified individuals from these areas to be arrested; yet, to date it is unknown how the SARP programme fared in attempts to retain the population in the areas where it was delivered. This will be investigated in the empirical analysis in sections 4.5-4.7.

So far, I have highlighted issues surrounding the spatial patterning of unemployment in the UK. The least employable individuals and those with least access to employment have been found to be concentrated in particular urban areas that have experienced economic decline in industrial and manufacturing employment opportunities, leaving men in particular vulnerable to unemployment and economic inactivity generally. In addition, migratory patterns into and out of disadvantaged neighbourhoods suggest a process through which area measures of unemployment may remain stagnant, as the more qualified, younger and dynamic households tend to leave and are replaced by individuals less likely to be employed. In addition, it has been seen that area-based regeneration may simply reinforce this stagnation by aiding outward migration through the provision of supply-side measures like employment advice and vocational training. The issues presented here therefore pose key challenges for area regeneration policy. The following section will reflect on these issues, and consider the ways in which area regeneration in Scotland has attempted to address spatial concentrations of unemployment in order to turn round the fortunes of disadvantaged areas.

Section 4.4 Scottish area regeneration policy and unemployment

It is well documented that the established approach to regenerating disadvantaged and declining areas is to develop a comprehensive programme that focuses on physical/environmental, social and economic action in order to help people in places experiencing multiple deprivation reverse decline and create sustainable communities (Couch et al. 2003; Brown 2006; Thomson et al. 2007). However, the record of the ability of comprehensive regeneration to deliver improvement on each of these three fronts in Scotland has been patchy (Carley 2002). In regards to unemployment, addressing the dual issues of a decline of job opportunities in disadvantaged areas coupled with a low-skilled labour pool poses difficult challenges, and it has been argued that the greatest weakness of the holistic approach to area regeneration policy in Scotland has been in the demand side of

economic regeneration, particularly in regards to the creation of new jobs (McGregor et al.1999; Turok 2004).

Job creation as part of a Scottish holistic regeneration programme was attempted for the first time in the late 1970s through the Glasgow Eastern Area Renewal (GEAR) project which attempted to create jobs through facilitating improvements to the environment and infrastructure to attract and retain industry (Turok (2004). The GEAR project was the largest of six Scottish Development Agency area-based initiatives set up in Scotland's central belt to deal with declining urban areas such as eastern Glasgow and Clydeside. However, the Scottish Development Agency suffered from having limited resources that were simply incapable of tackling the types of issues (such as decontamination, site preparation, new roads and property provision) that needed to be addressed in order to attract investment by potential employers into the GEAR areas (Turok 2004). Instead, the focus of the project shifted to city centre initiatives which are more desirable for private investors.

The other aspects of the holistic GEAR programme, like the regeneration of housing stock, were more successful in providing new homes and better stock which improved the area aesthetically. This did little for jobs and incomes, however, which kept declining (Turok 2004). Furthermore, an evaluation of the GEAR project in 1986 found that the programme had been unsuccessful in its attempts at job creation and advised that the project should never have attempted such a thing in the first place (Webster 2002). The evaluation recommended that regeneration projects should have a clearly defined focus on training and job placements to tackle unemployment, a recommendation that (without local government consultation) was used to form the basis of a new holistic area regeneration programme called New Life for Urban Scotland (Webster 2002). The emphasis on training and job placements in regards to unemployment strategy was congruous with a wider regeneration policy shift towards focussing on social and community issues, which for Turok (2004) reflected the view that economic development was difficult to achieve within poorer areas but simpler at the wider regional level (McCrone, 1991). The location or even total number of jobs was said to matter less than the ability of the unemployed to compete in the wider labour market, despite a lack of supporting analysis (Webster, 1994, 2002).

In addition, a change of strategy from job creation to more supply-side aspects such as training and job placement was seen as more cost effective and implied that the causes of unemployment were due to deficiencies in personal skills rather than labour demand shortages, despite increasing job shortages in urban areas (Turok 2004). However, as was noted above (section 4.3), the view that regeneration programmes should tackle unemployment through finding ways to actually create jobs as opposed to focusing on increasing the employability of residents has been challenged by others as

job creation alone may not sufficiently tackle concentrations of long-term unemployment. Even in areas where jobs growth is high, when jobs are available they are more likely to be taken by the short-term, job-ready unemployed (Campbell and Sanderson 1999, cited in Campbell 2000). Thus, job-rich areas are seen as no better than job poor areas at getting the long-term unemployed into work. Spatial concentrations of unemployment and economic inactivity may exist for reasons other than a lack of jobs as jobseekers may experience problems gaining employment even when there is high demand for labour (Campbell and Sanderson 1999). For example, there may be jobs available that may actually be unattainable due to the levels of skills and experience required. Thus, a focus on the supply-side of employment in regeneration programmes has been stated to be necessary to "tackle the barriers that prevent the 'structurally' unemployed from accessing labour market opportunity" (Campbell 2000). This argument is persuasive, and whilst it would appear that addressing supply-side factors is perhaps less challenging than formulating a workable job creation strategy, an emphasis on improving the skills and qualifications of the workforce is a worthwhile and necessary undertaking as part of the regeneration effort. Improving skills and qualifications may also help to overcome barriers to engaging with the labour market such as personal (mental) health issues (Campbell 2000) and a lack of confidence.

However, the emphasis on supply-side measures can have a significant drawback if the residents who have benefitted from these measures find employment and move away to less deprived areas. With this in mind, the New Life for Urban Scotland (NLUS) area regeneration programme followed the GEAR project and focused its unemployment strategy on job placements for residents, training places, formal job advice, guidance and/or counselling in 4 deprived areas in Scotland (Castlemilk in Glasgow, Ferguslie Park in Paisley, Wester Hailes in Edinburgh and Whitfield in Dundee). Following £55m of expenditure over ten years (1989-1999), an evaluation of the programme by Tarling et al. (1999) found, in regards to its unemployment strategy, that:

> "18,582 job placements were made, 9726 training places provided and 3203 positive training outcomes achieved. Over 22,000 people were given formal job advice, guidance and/or counselling. During the life of the initiative the proportion of the working age population in employment rose significantly in Ferguslie Park (28% to 41%) and Whitfield (42% to 62%), remained constant in Castlemilk (38% to 36%) and fell in Wester Hailes (57% to 48%)."

These mixed results suggest that the focus on supply-side measures to tackle unemployment had been successful in Ferguslie Park and Whitfield but not in Castlemilk and Wester Hailes. The precise reasons for this are unclear. However, the evaluation also found that many residents who received training and job placements and actually found jobs, had moved out to better-off areas and were in turn replaced by residents in greater social need (Tarling et al. 1999), which therefore appears to

confirm the workings of the moving escalator theory (Cole et al. 2007) that works to undermine the regeneration effort and ultimately does not address spatial concentrations of unemployment. Nevertheless, Tarling et al explain however that their evaluation suffered from a key limitation pertaining to incomplete data over the period of the programme, stating that data collected by local regeneration partnerships in the 4 areas was often limited, especially from the early years of the programme and had not been collected systematically. Thus they were unable to make firm conclusions regarding the impact of the programme on out-migration as the ability to carry out meaningful secondary analysis of longitudinal data was impaired due to the data limitations.

The success of any regeneration effort is thus dependent on retaining the population in disadvantaged areas (Tarling et al. 1999) where those who move out tend to be residents who overall have a younger age profile than non-movers (Bailey and Livingstone 2007). A key issue therefore for regeneration strategies employing supply-side measures is to attempt to both help the local unemployed move into work whilst also working to ensure that they remain resident in the area when jobs have been found in order to halt the moving escalator processes that see disadvantaged areas stagnate over the long term. Whilst the NLUS programme did appear to help to slow down de-population to an extent, it would appear that this was less successful in Castlemilk and Wester Hailes. It is perhaps conceivable that other aspects of the NLUS programme in regards to housing and other environmental regeneration aspects such as improvements to green space, for example, were more successful in Whitfield and Ferguslie Park and acted to improve perceptions of these areas in the eyes of residents who would potentially have moved away otherwise. The supply-side approach to tackling spatial concentrations of unemployment was also employed in the SARP programme (Turok 2004). However, to date it is unclear whether the moving escalator effect that was found to have occurred in two of the four NLUS areas has also taken place in SARP areas.

In conclusion, these three sections (4.2-4.4) have firstly highlighted key individual characteristics that impact on the likelihood of experiencing (both short and long-term) unemployment that will be accounted for in the empirical analyses. Secondly, these sections have demonstrated key issues for evaluating the impacts that the SARP programme has had on unemployment. For example, it is apparent that it is crucial to investigate the consequences of supply-side approaches to tackling unemployment that have been taken by area regeneration programmes such as the SARP programme. It has been seen that supply-side approaches are vitally important in addressing the skills and qualifications shortfall which exists for socio-economically disadvantaged residents and for enabling these residents to be more competitive in the jobs market. However, at the same time these approaches can also appear to increase the likelihood that residents who have benefitted will

move out to less deprived areas, such as what appears to have happened with the (SARP predecessor programme) the NLUS. It is unclear whether the same moving escalator effect occurred as a result of the SARP programme, thus, in addition to the core purpose of this chapter (to investigate whether residents likelihood of being unemployed had improved or worsened from 1991-2001) the chapter will also investigate whether those who had their employment prospects enhanced by the programme then moved away from the area. The following section will outline how the empirical analyses attempt to investigate this.

Section 4.5 Outline of empirical analysis sections

The following sections contain the results of the empirical analyses of data from the Scottish Longitudinal Study (SLS) and focus on how the SARP programme impacted on the likelihood of unemployment for residents in regeneration areas compared with residents in comparator areas over time (1991-2001). Initially, in Section 4.6 I will discuss the summary statistics (see Table 3-4 in Chapter 3 Data and Methods) in relation to unemployment outcomes and results from unadjusted bivariate analyses exploring the links between the independent variables and the unemployment outcome variable prior to their inclusion the multivariate analyses. The bivariate analyses ascertain whether the relationships between each independent variable and the outcome variable are operating in ways that have been suggested by previous literature. The second stage involves a repeated cross-sectional area change analysis (Section 4.7) that moves beyond a purely ecological approach by using individual data from the Scottish Longitudinal Study (SLS) to investigate change in the likelihood of unemployment over time (1991-2001) for regeneration area residents when compared with comparator area residents. If the SARP programme has been successful in helping residents into employment and has retained residents in the areas, we would expect that, by 2001, those individuals resident in regeneration areas would have a lower likelihood of experiencing unemployment compared with individuals resident in comparator areas. However, as we have seen above, people may move out of regeneration areas once they have benefitted in some way from the programme, which can obscure the true impact of the programme for residents. Thus, Section 4.8 focuses on selective migration in regeneration and comparator areas and builds on the cross-sectional comparison by accounting for the fact that neighbourhood populations are rarely static. In this section I track the movements of residents into and out of regeneration and comparator areas to compare the likelihood of unemployment outcomes over time (1991-2001) for different migrant groups. The final stage of this analysis (Section 4.9) further extends the investigation by using a Difference in Differences (DiD) approach. This analysis is carried out to compare the difference in likelihood of unemployment in the treated group before and after the regeneration programme with

that in the comparator group, and therefore takes the changes occurring both in the treated and comparator groups into account. In this case we expect that even without the regeneration programme, the unemployment level would change in the treated and comparator areas between 1991 and 2001, reflecting the Scotland-wide change in the labour market. Thus by using the DiD I aim to identify whether the SARP programme has any net effects on residents in the treated group. The chapter will conclude by discussing the key results in relation to the two research questions set out in the introduction.

Section 4.6 Summary statistics and bivariate analysis

The previous chapter presented the table of summary descriptive statistics (Table 3-4) of all variables used in the modelling for the research population, which were drawn from the Scottish Longitudinal Study (SLS) and represent all eligible members of the SLS sample in both regeneration and comparator areas in 1991 and then 2001. It should be noted that simple comparisons using summary statistics are limited in that describing sets of observations with single indicators can risk distortion of the original data and loss of detail. However, despite these limitations, descriptive statistics are useful to summarise the main features of the dataset used here as it pertains to unemployment, which in this case facilitates a base-level understanding that I will build on in the following sections.

Table 3-4 demonstrated that in the SARP areas, unemployment decreased from 7.43% in 1991 to 3.68% in 2001, i.e. a reduction of 3.75%. However, in comparator areas unemployment decreased by 3.83 % (7.51% to 3.68%) which therefore suggests that the initiative was not successful in reducing unemployment in the SARP areas beyond national trends over the ten year period. In addition, summary figures that may have relevance to supply-side work undertaken by the SARP initiative further suggest that the programme did not have a positive impact when assessed against the similarly deprived non-treated comparator areas. For example, in regards to qualifications, at the 1991 baseline almost 3.5% of residents in regeneration areas possessed sub-degree qualifications, and this increased to 4.5% in 2001, an increase of 1%. However, in comparator areas over the same time period there was a larger increase of 1.5% (2.67% in 1991 to 4.17% in 2001) in residents with sub-degree level qualifications. For degree and higher degree qualifications, there was a 6.73% rise in residents possessing these qualifications in SARP areas over the time period (2.52% in 1991 to 9.25% in 2001) which is 1.64% above the 5.09% rise which was observed in comparator areas (1.81% in 1991 to 6.9% in 2001).

In regards to other supply-side measures undertaken as part of the SARP programme, such as vocational training (Taylor, date unknown), the summary statistics show that the number of

residents reporting themselves as occupying skilled manual positions did not increase over time (13.7% in 1991, 12.82% in 2001) in SARP areas. This was also found in comparator areas. Nevertheless, the number of residents reporting themselves as occupying partly skilled jobs increased in SARP areas by 2.35% (11.68% in 1991 and 14.03% in 2001). However a similar increase (1.69%) was reported in comparator areas (12.64% in 1991 and 14.33% in 2001) suggesting that no regeneration effect occurred. The summary figures also show a small increase in unskilled workers in SARP and comparator areas. These descriptive results therefore do not provide evidence to suggest that the SARP programme was effective in improving employment outcomes for area residents.

Table 4-1 below presents the results of this bivariate analysis for each independent variable and largely confirms the bivariate relationships are indeed operating as the literature considered earlier suggests. For example, the table demonstrates that women are less likely to be unemployed than men at both 1991 and 2001, confirming that working age male individuals may be more likely to be unemployed in disadvantaged areas. In addition, married individuals are less likely to unemployed than single individuals, which further confirm the findings from literature outlined earlier in this chapter. Furthermore all social classes categories are more likely to be unemployed than the reference category of professionals at both time points whilst those who possess qualifications are less likely to be unemployed than those with no qualifications at both time points. Non-white residents are found to be more likely to be unemployed than white residents at 1991 and 2001 which appears to support the spatial mismatch hypothesis stated earlier in this chapter. In addition, those who rent their homes are more likely to be unemployed than home owners, which also supports previous literature that has found employed home-owners to be less likely to become unemployed relative to renters (e.g. Leuvensteijn and Koning 2004). Those residents who live alone are also more likely to be unemployed than those who live with others at both time points, whilst those who own cars are less likely to be unemployed than those who do not own cars at both time points, also confirming findings of previous literature (e.g. Gurley and Bruce 2005). Finally, lone parent families are more likely than married and unmarried couples with no dependent children to be unemployed at both time points, which also accords with the findings of previous studies (e.g. Webster 2002).

Table 4-1 Results from logistic regression modelling predicting the bivariate relationship between each independent variable and the unemployment outcome variable

Bivariate (unadjusted) links between independent variables and unemployment outcome variable		1991 (n=18634)		2001 (n=10346)	
Variable	**Category**	**OR**	**95% CI**	**OR**	**95% CI**
Age	Age (centred)	0.99 ***	0.98,0.99	0.99 *	0.98,0.99
Age Squared	Age Squared	1.00 ***	1.00, 1.00	0.99	0.99,1.00
Sex	Male (reference)	1		1	
	Female	0.54 ***	0.49, 0.58	0.49 ***	0.42, 0.58
Marital Status	Single (reference)	1		1	
	Married	0.43 ***	0.39, 0.46	0.36 ***	0.30, 0.43
	Widowed	1.27 ***	1.11, 1.45	0.83	0.65, 1.06
	Divorced	0.64 **	0.46, 0.88	0.57 *	0.32,0.99
Social Class	Professional (reference)	1		1	
	Managerial	1.55	0.92, 2.61	0.93	0.45, 1.88
	Skilled and non-manual	1.91 *	1.14,3.20	1.86	0.93, 3.72
	Skilled-manual	3.87 ***	2.33, 6.43	3.00 **	1.52, 5.92
	Partly-skilled	4.88 ***	2.94, 8.11	3.57 ***	1.81, 7.06
	Unskilled	5.16 ***	3.08, 8.63	3.63 ***	1.79, 7.33
	Never worked	138.96 ***	82.25, 234.78	30.20 ***	14.55,62.71
Qualifications	No qualification & NCR persons under 18 (reference)	1		1	
	Sub-degree	0.22 ***	0.16, 0.30	0.57 **	0.40,0.82
	Degree & higher	0.32 ***	0.24,0.42	0.37 ***	0.27, 0.50
	Not stated	2.05 ***	1.71, 2.45	1.61 *	1.01, 2.53
Ethnicity	White (reference)	1		1	
	Non-white	1.59 *	1.07, 2.38	2.78 **	1.45, 5.33
House Tenure	Owner occupied (reference)	1		1	
	Social renting	5.29 ***	4.79, 5.84	6.11 ***	5.13, 7.28
	Private renting	3.76 **	3.10, 4.58	7.91 ***	5.77, 10.84
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.53 ***	0.42,0.65	0.51 ***	0.41,0.71
Car ownership	0 cars (reference)	1		1	
	1 cars	0.25	0.23, 0.27	2.68	1.07, 2.67

		***		*	
	2 cars	0.14 ***	0.12, 0.17	0.78	0.31, 1.96
	3 cars	0.15 ***	0.10, 0.23	0.36 *	0.13, 1.15
Household type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	2.79 ***	2.52, 3.09	3.14 ***	2.56, 3.85
	One parent families with dependent children	2.47 ***	2.02, 3.71	2.92 ***	2.15, 3.96
	Married and unmarried couples with dependent children (reference)	1.23 ***	1.09,1.38	1.11	0.88, 1.40

* p<0.05, **p<0.01, ***p<0.001

Section 4.7 Repeated cross-sectional area change analysis: likelihood of unemployment over time

We have seen that a key aim of the SARP programme's economic strategy was to reduce unemployment levels in disadvantaged areas. However, the evidence regarding the success of the programme in this respect is patchy and subject to important data limitations. The purpose of this section is therefore to investigate if, by 2001, the SARP programme had reduced the likelihood of unemployment for residents. A quasi-experimental repeated cross-sectional approach is used to address the first of the two research question set out in the chapter introduction:

- Does living in SARP areas have a positive or negative impact on the likelihood of residents being unemployed compared with residents living in comparator areas that did not receive the programme?

The focus here is on area level change over time; and in order to move beyond purely ecological analysis and thus avoid the ecological fallacy (as discussed in Chapter 3 Data and Methods) I employ individual-level data from the Scottish Longitudinal Study (SLS). This analysis therefore compares how regeneration area residents have fared in relation to comparator area residents at two points in time, 1991 (before the SARP initiative began) and 2001 (five years after it began), by investigating how likely individuals resident in regeneration areas at these two time points are to be unemployed relative to resident in comparator areas. If the SARP programme has been successful we would expect that by 2001, the regeneration areas would contain residents who are less likely to be unemployed than comparator area residents. However, previous research presented earlier in this chapter concerning the NLUS programme showed that it is unclear whether this initiative, which was

essentially a precursor to the SARP and adopted a very similar approach to dealing with unemployment (Turok 2004), was successful in regards to unemployment as in two of the four areas in which it had been initiated, employment levels had either remained constant or had fallen. In addition, the programme was found to be unable on the whole to retain people who had received employment related benefits from the programme in the area. Given the findings of the NLUS evaluation, (Tarling et al. 1999), I hypothesise in this section (hypothesis 1) that by 2001, regeneration area residents will display no statistically significant decrease in the likelihood of unemployment compared with residents in comparator areas. In terms of the moving escalator effects this hypothesis assumes that those who have had their employment outcomes boosted by the programme, will have moved out and been replaced by disadvantaged individuals. Thus, as cross-sectional analysis does not follow individuals through time, I expect the results to display no discernible change on likelihood of unemployment for regeneration area residents from 1991 to 2001 compared to comparator area residents.

Section 4.7.1 Modelling

I fit three binary logistic regression models where unemployment is the dependent variable in order to ascertain the likelihood of being unemployed for people in regeneration areas relative to comparator areas in 1991 and then 2001. The reference category is the comparator areas and I add progressively more individual and household explanatory variables to account for further characteristics that may impact on the likelihood of an individual being unemployed.

- Model A (1991): includes only the area type: regeneration area versus comparator areas (reference category) at the 1991 baseline. This model therefore predicts the likelihood of unemployment for regeneration area residents compared with comparator area residents without accounting for individual or household characteristics.
- Model B (1991): includes the area type: comparator areas (reference category) and regeneration areas, and individual explanatory variables that I expect (following the findings detailed in this chapter's overview sections 4.2-4.4) will impact on the likelihood of an individual experiencing unemployment. These variables are: age, age^2, sex, marital status and social class at the 1991 baseline. The overview sections above demonstrated that older, male individuals may be more likely to be unemployed due to manufacturing decline which is why the age and sex variables are included. In addition, single individuals may be more vulnerable to unemployment (Sanderson et al. 1999) which is why the variable for marital status is added. The social class variable is also included as we have seen that residents with particular social class backgrounds (i.e. manual workers) may be more susceptible to

unemployment. Age is treated as a continuous variable and age^2 is included to allow for the non-linear effects of age on unemployment.

- Model C (1991): includes the area type: comparator areas (reference category) regeneration areas, and extended individual and household explanatory variables in addition to those used in Model B. This model is designed to account for further characteristics that may impact on the likelihood of an individual being unemployed. These are: educational qualifications, ethnicity, housing tenure, persons living in the dwelling, car ownership and household type at the 1991 baseline. These variables are included as residents with low educational qualifications may be more likely to be unemployed, whilst I also want to assess whether minority ethnic groups are more vulnerable to unemployment in disadvantaged areas. In addition, a variable regarding housing tenure is included here to assess whether home-owners may be less likely to become unemployed relative to social and private renters. I also include a variable on persons living in the dwelling to specifically investigate if living alone is related to a higher risk of unemployment. Furthermore, a variable on car ownership is included as car access is known to increase the probability of being employed. Lastly, I include a variable on household type to investigate whether lone parents may be more likely to experience unemployment.
- This modelling sequence was then repeated for 2001, 5 years after the regeneration programme had started.

Finally, sensitivity tests were carried out for the models with all variables added (i.e. Cross-Sectional Model C 1991 and 2001; Selective Migration Model F 1991 and 2001; Difference in Difference Model I) but where the 'never worked' category of the social class variable was dropped. 'Never worked' is a residual category combining those whose occupation is not adequately described, unstated or have had no job in the last 10 years and of course those who have never worked. It therefore does not coincide 100% with unemployment despite being heavily correlated. The purpose of the sensitivity testing was thus to investigate whether all model components were justified given that 'never worked' category of the social class variable might be correlated with the unemployment outcome variable. The results from the sensitivity analyses are shown in Appendix 6 and confirm that the findings presented here are robust in that no differences were found in relation to the main results looking for increased or decreased likelihood of unemployment between regeneration and comparator residents. Thus the sensitivity testing confirmed that modelling components were justified. Slight differences were found in the predictor variables on one model only; which was the selective migration 2001 model (Model F 2001). These differences are discussed in section 4.8.

Table 4-2 below presents the results of the repeated cross-sectional analysis designed to investigate the likelihood of being unemployed for residents in SARP areas compared with residents in comparator areas at the baseline period in 1991 and then again in 2001, five years into the programme. Overall the results for Models A-C across the ten year time period appear to support hypothesis 1, which states that by 2001, regeneration area residents will display no statistically significant decrease in the likelihood of unemployment compared with residents in comparator areas.

As expected, Model A at the 1991 baseline demonstrates no significant difference on the likelihood of being unemployed between residents in the regeneration areas to-be and those in comparator areas. This suggests that the regeneration and comparator areas are well matched at the baseline. However, the results show that this is also the case for Model A in 2001, five years into the regeneration programme, which therefore supports hypothesis 1.

With the addition of several individual-level variables (age, age squared, sex, marital status and social class) that may help to shed light on how unemployment varies across the population, the results in Model B 1991 and 2001 also support hypothesis 1. The results demonstrate that the profile of the individual who is most likely to be unemployed is consistent across the ten year period. For example, at the 1991 baseline, the person most likely to be unemployed is an older, single man from an unskilled social class. This is consistent with previous literature that has found those experiencing long-term unemployment were more likely to be older, male workers and those with low or no qualifications (e.g. Begum 2004). In addition, individuals who were in skilled manual occupations (OR=2.50, p=0.01) or partly skilled occupations (OR=4.03, p<0.001) were also likely to be unemployed at baseline, which can be seen as a clear reflection of the manufacturing decline discussed in section 4.2. This also demonstrates that social class is likely to be a key driver of the experience of unemployment for individuals living in disadvantaged areas. These findings are maintained in Model B 2001, which again demonstrates that the type of resident who is most likely to be unemployed is older, single, male and unskilled.

Indeed, Model B (1991) and (2001) supports the assertion that social class is the main driver of unemployment for individuals in unskilled, partly skilled, and skilled and non-manual occupations who become more likely to be unemployed across the ten year period. In 1991 unskilled residents are over six times (OR=6.45, p <0.001) more likely than professional residents to be unemployed, and this rises to over seven times more likely in 2001 (OR=7.13, p <0.001), whilst for the partly skilled the likelihood of unemployment rises only slightly (OR=5.41, p <0.001 in 1991 and OR=5.67, p<0.001 in 2001. A similar effect is also noted for skilled and non-manual residents who were two

and a half times more likely than professionals to be unemployed in 1991 (OR=2.50, p<0.01), which had increased by 2001 to over three times more likely (OR=3.2, p<0.001). However, for skilled manual residents the likelihood of unemployment fell slightly over the 10 year period from just over four times more likely than the reference category (OR 4.03, p <0.001) to just over three and a half times more likely to be unemployed (OR 3.58, p <0.001). Therefore it is important to note that even once these variables are accounted for; there is no difference between regeneration and comparator areas at either date.

However, the impact of social class on the likelihood of unemployment alters somewhat in Model C (1991) and (2001) with the addition of further individual and household variables (educational qualifications, ethnicity, housing tenure, persons resident in the dwelling, car ownership and household type) that can further explain how unemployment varies across the population in regeneration and comparator areas. For example, when these additional explanatory variables are added, the size of the effect for unskilled individuals is reduced but still demonstrates that the likelihood of unemployment for unskilled residents compared with professionals increases slightly over the ten year period from just over two times more likely in 1991 (OR=2.32, p <0.01), to nearly three times more likely in 2001 (OR=2.87, p <0.001). A similar effect is noted for the partly skilled and skilled manual categories.

Again Model C (1991 and 2001) shows that there is no significant difference for residents in regards to the likelihood of experiencing unemployment in regeneration areas compared to comparator areas by 2001, which further supports hypothesis 1. In addition, over the ten year period the profile of the type of individual who is most likely to report unemployment does not change. These models indicate that, in addition to the finding from Model B that older, unskilled males are the most likely to be unemployed, single, ethnic minority residents with no qualifications who live in privately rented accommodation, co-habit with others, do not own a car and have dependent children are also more likely to be unemployed compared with other groups. These results again confirm findings from previous literature, for example individuals from ethnic minorities have been found to suffer the highest rates of unemployment due to spatial mismatch issues in disadvantaged areas. Figures from the 1991 UK census have shown that unemployment rates for ethnic minority residents were approximately double the rate of 9% for white residents (Fieldhouse 1999). In regards to qualifications, Bailey and Livingstone (2005) found that deprived areas in Scotland had 80% of people with low qualifications compared with just 35% in the least deprived areas. Thus, having few qualifications will place an individual under an increased risk of unemployment or low income and, ultimately, poverty. Housing tenure has also been found to play a part in the length of time an

individual is unemployed. For example, home owners have been found to experience shorter terms of unemployment compared to renters (Munch, Rosholm and Svarer 2006), whilst (as stated above) employed home-owners may also be less likely to become unemployed relative to renters (Leuvensteijn and Koning 2004). Further, as has also been stated earlier, car ownership has been found to be strongly associated with a decreased likelihood of experiencing unemployment (Gurley and Bruce 2005). In regards to the household type variable, the results from Model C show that in 1991 unmarried adults were one and a quarter times more likely to be unemployed than married and cohabiting couples without children (OR=1.25, $p < 0.05$). Couples (married and co-habiting) with children were also more likely to be unemployed in 1991 (OR= 1.21 $p<0.05$). In regards to lone parents, it has been argued that lone parents have an increased propensity to experience unemployment (Webster 2002, Begum 2004); however the results for the 1991 baseline do not demonstrate that lone parents in the current study were more likely to be unemployed. Nevertheless, the results from 2001 do indeed confirm that lone parents were over twice as likely as couples without children to be unemployed, a results which was highly significant (OR= 2.31, $p < 0.001$). In addition, the results from 2001 again indicate that married and co-habiting couples with dependent children are more likely to be unemployed (OR= 1.30, $p<0.05$) compared with couples with no dependent children. These results therefore suggest that having dependent children increased the likelihood of being unemployed for residents in regeneration and comparator areas. This is consistent with Begum (2004) who state that people with dependent children may be less flexible than childless individuals in regards to the location of their job or the hours they can work. In addition lone parents who do not have the option of sharing childcare duties with a partner may be at a particular disadvantage. Finally the results from 2001 again show that single adults are more likely to be unemployed compared to the reference category (OR= 1.56, $p<0.001$).

These results demonstrate that the repeated cross-sectional analysis supports the hypothesis (hypothesis 1) which stipulates that by 2001, regeneration area residents will display no statistically significant decrease in the likelihood of unemployment compared residents in comparator areas. In addition the profile of residents most likely to experience unemployment does not change over the ten year period, which is despite the fact that Scotland (and indeed the rest of the United Kingdom) was in the middle of a period of recession in 1991 lasting from 1990 until 1992. Thus, at this stage of the analysis I can, in response to the first research question for this chapter, state that living in a SARP area appears to had no positive or negative impact on the likelihood of being unemployed for residents compared with residents living in similarly deprived comparator areas that did not receive the programme.

However, an absence of any positive or negative regeneration effect in this cross-sectional analysis may be due to moving escalator processes whereby those who have benefitted from the SARP initiative have left and been replaced by relatively disadvantaged residents. This will therefore be investigated in the next section where I analyse whether those who moved out of regeneration and comparator areas were less likely to be unemployed and if those who moved in were more likely to be unemployed. The following section therefore takes into account the movements of residents by focusing on selective migration.

Table 4-2 Repeated cross-sectional logistic regression models predicting the odds of being unemployed in regeneration areas relative to comparator areas

Odds of being Unemployed:		1991						2001					
Repeat Cross-sectional													
Variable	**Category**	**Model A (n=18634)**		**Model B (n=18634)**		**Model C (n=18634)**		**Model A (n=15052)**		**Model B (n=15007)**		**Model C (n= 14682)**	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Area Type	Comparator area (reference)	1		1		1		1		1		1	
	Regeneration area	0.93	0.86, 1.01	0.98	0.89, 1.08	1.03	0.94, 1.14	0.92	0.82, 1.03	0.94	0.84,1.07	1.02	0.89, 1.16
Age	Age (centred)			1.00	0.99, 1.00	1.00	0.99, 1.00			0.99	0.99, 1.00	0.99	0.99, 1.00
Age Squared	Age Squared			1.00 ***	1.00, 1.00	1 ***	1.00, 1.00			1.00 *	1.00, 1.00	1.00 **	1.00, 1.00
Sex	Male (reference)			1		1				1		1	
	Female			0.55 ***	0.50, 0.61	0.53 ***	0.47, 0.59			0.54 ***	0.47, 0.62	0.45 ***	0.39, 0.53
Marital Status	Single (reference)			1		1				1		1	
	Married			0.50 ***	0.44, 0.57	0.74 **	0.62, 0.89			0.37 ***	0.32, 0.44	0.76 *	0.61, 0.94
	Widowed			1.33 **	1.11, 1.60	1.12	0.93, 1.35			0.97	0.77, 1.21	0.86	0.68, 1.10
	Divorced			0.64 *	0.43, 0.95	0.55 **	0.36, 0.83			0.80	0.48, 1.33	0.73	0.41, 1.29
Social Class	Professional (reference)			1		1				1		1	

	Managerial	1.91 *	1.13, 3.22	1.42	0.81, 2.49	1.25	0.72, 2.18	1.19	0.67, 2.12
	Skilled and non-manual	2.50 **	1.48, 4.20	1.41	0.80, 2.50	3.19 ***	1.86, 5.46	2.05 *	1.15, 3.64
	Skilled-manual	4.03 ***	2.42, 6.71	2.07 *	1.18, 3.63	3.58 ***	2.10, 6.09	2.21 **	1.24, 3.91
	Partly-skilled	5.41 ***	3.25, 9.02	2.44 **	1.38, 4.32	5.67 ***	3.34, 9.62	2.81 ***	1.58, 4.98
	Unskilled	6.45 ***	3.84, 10.84	2.32 **	1.33, 4.04	7.13 ***	4.14, 12.30	2.87 ***	1.58, 5.18
	Never worked	146.3 ***	86.30248.2	54.15 ***	30.0496.47	50.66 ***	28.61 89.69	25.06 ***	13.44, 46.74
Qualifications	No qualification and NCR persons under 18 (reference)			1				1	
	Sub-degree			0.63 **	0.45,0.89			0.65 **	0.49, 0.86
	Degree and higher			0.74	0.52, 1.05			0.50 ***	0.37, 0.66
	Not stated			1.18	0.92, 1.50			0.97 *	0.63, 1.48

Ethnicity	White (reference)	1		1	
	Non-white	2.24 **	1.34, 3.76	2.23 **	1.39, 1.57
House Tenure	Owner occupied (reference)	1		1	
	Social renting	2.45 ***	2.17, 2.75	2.89 ***	2.48, 3.36
	Private renting	2.02 ***	1.60,2.55	3.67 ***	2.90, 4.64
Persons living in the dwelling	Living alone	1		1	
	Not living alone	0.73 ***	0.62,0.85	0.74 **	0.61, 0.91
Cars	0 cars (reference)	1		1	
	1 cars	0.43 ***	0.40, 0.50	0.50 ***	0.43, 0.58
	2 cars	0.31 ***	0.25, 0.39	0.42 ***	0.33, 0.53
	3 cars and over	0.34 ***	0.23, 0.52	0.37 ***	0.23, 0.60
Household type	Married and unmarried couples with no dependent children (reference)	1		1	

	Unmarried adult			1.25 *	1.04, 1.51			1.56 ***	1.23, 1.98	
	One parent families with dependent children			1.23	0.94, 1.64			2.31 ***	1.70, 3.12	
	Married and unmarried couples with dependent children			1.21 *	1.04, 1.41			1.30 *	1.04, 1.64	
	Log Likelihood	-8210.6242	-6314.2174		-5878.3489	-4427.3845	-3820.7799		-3349.1305	

* p<0.05, **p<0.01, ***p<0.001

Section 4.8 Selective Migration analysis: likelihood of unemployment over time for remainders, out-movers and in-movers.

We have seen that the success of an area regeneration initiative is dependent on the ability to retain the population in the area. Tarling et al. (1999) found that many residents who received training and job placements and actually found jobs had moved out to better-off areas, and were in turn replaced by residents in greater social need, creating a moving escalator process which served to undermine the regeneration effort and ultimately does not address spatial concentrations of unemployment.

Similar findings in regards to employment have been in observed in other studies such as that by Andersson and Brama (2004). This Swedish study focused on residential mobility and selective migration in disadvantaged neighbourhoods subject to area-based regeneration in Stockholm and found evidence to suggest that migration flows into and out of these areas were selective. For example, they found that individuals who moved into regeneration areas in Stockholm, Sweden were more likely to be unemployed and on social benefits and have lower incomes than those who moved out and those who remained in the neighbourhoods. Thus, they contended that the out-flow of relatively better-off individuals combined with the in-flow of relatively disadvantaged groups works to reproduce the distressed character of neighbourhoods.

The literature on the effects of area regeneration on selective migration in general, however, is still contested ground. As we have seen in Chapter 2 of this thesis, other evaluations on the impacts of area regeneration programmes on migration have found evidence to suggest that migration can work to actually alleviate concentrations of deprivation in regeneration areas relative to other disadvantaged areas, albeit in a very modest way (Bailey and Livingstone 2008; Jivraj 2008).

Nevertheless, bearing in mind the evidence currently available from Tarling et al. (1999) and Andersson and Brama (2004) that specifically considers the impact of area regeneration programmes on selective migration in regards to employment outcomes, I propose two hypotheses in this section that investigate whether or not the findings of these two evaluations hold for this analysis. I hypothesise therefore (hypothesis 2) that those who move out of regeneration areas will be less likely to be unemployed than the reference category (residents who remain in comparator areas from 1991-2001), whilst those who move in to regeneration areas will have no significant difference in regards to likelihood of unemployment compared with the reference category (hypothesis 3). These hypotheses presuppose that a moving escalator process has occurred in regeneration areas and thus assume that those who have moved out are those who have 'got on' and had their employment outcomes significantly improved through the regeneration programme

compared with 'untreated' comparator residents. In comparison those who move in are presupposed to be relatively disadvantaged individuals who will display no significant difference to 'untreated' comparator residents in regards to likelihood of unemployment.

To investigate these hypotheses I again use SLS data to compare the odds of being unemployed for varying migrant groups in regeneration and comparator areas. In order to assess the impacts of migration on area characteristics, it is important to understand flows in both directions (Bailey and Livingstone 2007), thus a key reason for employing SLS data to investigate the health and well-being impacts of area regeneration is that one can use these data to track the movements of individuals into and out of regeneration and comparator areas. This analysis therefore adds an original contribution to the literature as previous studies of migration in area based initiatives have looked mainly at the flows to and from regeneration areas and not those to and from comparable non-intervention areas (Bailey and Livingstone 2008).

A nine-category variable was created to model various moving permutations between regeneration areas, comparator areas and other areas in Scotland and to identify residents who remained in both regeneration and comparator areas throughout the ten year period. This variable identifies SLS members at their origin in 1991 and their destination in 2001. For example, category 4 identifies those SLS members who lived in a regeneration area in 1991 but by 2001 they had moved out and were living in a comparator area.

Table 4-3 Population group categories for selective migration analysis

1	Remain in Comparator area (1991-2001)
2	Comparator area (1991) to Regeneration area (2001)
3	Comparator area (1991) to area in the rest of Scotland (2001)
4	Regeneration area(1991) to Comparator area (2001)
5	Remain in Regeneration area (1991-2001)
6	Regeneration area (1991) to area in the rest of Scotland (2001)
7	Rest of Scotland (1991) to Comparator Area (2001)
8	Area in the rest of Scotland (1991) to Regeneration Area (2001)
9	Rest of Scotland (1991) to area in the rest of Scotland (2001)

This comparative analysis is thus undertaken to investigate both of the research questions for this chapter but focuses particularly on the second:

(2) Does the likelihood of being unemployed differ for varying migrant groups who moved into, out of and remain in SARP treatment areas and comparator areas?

Logistic regression models were fitted to investigate the odds of being unemployed for the differing migrant groups and for remainers in regeneration areas compared to remainers in comparator areas. This outcome was assessed for residents at baseline in 1991 through to 2001. It is important to note that in the 1991 models, groups 7, 8 and 9 were purposely removed from the analyses. The individuals in these groups were not resident in either a regeneration or comparator area in 1991 and were therefore neither residents that were originally intended to benefit from SARP, nor matched comparator residents and thus not relevant to the analysis. Similarly, groups 3, 6 and 9 were removed from the 2001 models as residents in these areas were not in a regeneration or comparator area at this point in time and were again not relevant to the analysis. As with the

previous analyses, I added progressively more explanatory variables to the following models in order to account for the factors that may affect the likelihood of unemployment:

- Model D (1991): includes group indicators (reference category, comparator area residents remaining in comparator areas (1991-2001) relative to groups 2-6 at their place of origin at the 1991 baseline.
- Model D (2001): includes group indicators (reference category, comparator area residents remaining in comparator areas 1991-2001) relative to groups 2, 4,5,7,8 at their destination area by 2001, 5 years after SARP had begun.
- Model E (1991): includes group indicators (reference category, comparator area residents remaining in comparator areas 1991-2001) relative to groups 2-6 and basic demographic characteristics (age, age^2, sex, marital status and social class) at their place of origin at the 1991 baseline.
- Model E (2001): includes group indicators (reference category, comparator area residents remaining in comparator areas 1991-2001) relative to groups 2,4,5,7,8 with the same basic control as Model B 1991) at their destination area by 2001, 5 years after SARP had begun.
- Model F (1991): includes group indicators group 1 (reference category, comparator area residents remaining in comparator areas 1991-2001) relative to groups 2-6 with extended control for further demographic characteristics (educational qualifications, ethnicity, housing tenure, persons living in the dwelling, car ownership and household type) at their place of origin at the 1991 baseline.
- Model F (2001): includes group indicators (reference category, comparator area residents remaining in comparator areas (1991-2001) relative to groups 2,4,5,7,8 with the same extended control as Model C 1991 at their destination area by 2001, 5 years after SARP had begun.

Table 4-4 below presents the results of the selective migration analysis that follows the same individuals from differing migrant and remainer groups of residents through time to investigate their likelihood of being unemployed relative to 'untreated' residents who remain in comparator areas over the ten year period (the reference category). Overall the results for models D-F (1991-2001) across the ten year time period do not support hypotheses 2 and 3 set out above. Moreover, when additional variables are added to account for factors that may affect the likelihood of unemployment, the results for the study population are largely similar to those observed in the repeated cross-sectional analysis.

Firstly, Model D (1991) demonstrates no significant difference in the likelihood of unemployment for groups 2,3,5,6 who were resident in regeneration or comparator areas at baseline. However, the results for group 4 (regeneration to comparator area) show that this group was significantly more likely to be unemployed at baseline (OR= 1.91, $p<0.001$). However when individual and household characteristics are accounted for in Model B this effect becomes non-significant. Model D (2001) also displays no significant differences in likelihood of unemployment for the population groups at their destinations in 2001.

In regards to Model E (1991 and 2001), the results show no significant differences between the reference group and the migration groups and remainers in SARP areas in likelihood of unemployment. In addition the explanatory variables demonstrate very similar results and effect sizes to those from Model B in the repeated cross-sectional modelling, in that the profile of the person most likely to be unemployed is older, male, unskilled and either single or (in one difference from the cross-sectional modelling) divorced. The main driver in regards to the likelihood of unemployment in Model E is social class which again corresponds to the repeated cross-sectional modelling.

Model F (1991 and 2001) also displays no significant differences between the reference group and other migration groups. Again, the results for the additional explanatory variables (educational qualifications, ethnicity, housing tenure, persons resident in the dwelling, car ownership and household type) are very similar to the earlier repeated cross-sectional analysis. Thus, with the addition of these further explanatory variables in Model F we observe that the characteristics most likely to increase the odds of experiencing unemployment are being single, from an ethnic minority, having no educational qualifications, living in accommodation that is rented privately and that is co-habited with others, not owning a car, and having dependent children. Again, the effect sizes and patterns from 1991 and 2001 largely replicate what was found in the repeated cross-sectional modelling. However, the sensitivity analysis for Model F 2001 (Appendix 6) shows that when the 'never worked' category of the social class variable is removed from the model all social class categories that were significant (categories 3, 4, 5 and 6) become non-significant despite the effect sizes remaining very similar. The reasons behind this change will require further research. Nevertheless it is important to re-state of course that the main results looking for differences between regeneration and comparator areas do not change in the sensitivity analysis Model F (2001).

These results demonstrate that the selective migration analysis rejects hypotheses 2 but supports hypothesis 3 and thus does not support the moving escalator hypothesis. However this cannot be

confirmed entirely as this analysis concentrates only on residents in SARP and comparator areas and thus does not include those who have moved out to areas in the rest of Scotland. The hypotheses were set up to investigate moving escalator effects pertaining to the likelihood of unemployment experienced by residents moving out of and into SARP and comparator areas relative to residents remaining in comparator areas over the ten year period. I reject hypothesis 2 as those who move out of regeneration areas were not found to be less likely to be unemployed than the reference category (residents who remain in comparator areas from 1991 to 2001). However, the results support hypothesis 3 as those who moved into regeneration areas are not significantly different in regards to the likelihood of unemployment compared with the non-treated group. I can therefore conclude at this stage of the analysis that no evidence of moving escalator effects is observed and, ultimately, that no evidence regarding the efficacy of the SARP programme to improve the employment outcomes of these residents relative to comparator residents who did not receive the programme has been found.

Present evidence on the propensity for regeneration initiatives to exacerbate selective migration by improving employment outcomes for residents is mixed. Evaluations of differing area regeneration programmes such as those by Tarling et al. (1999), Andersson and Brama (2004) and Cheshire et al. (2003) have all found evidence to support moving escalator effects that work to the detriment of the regeneration area. However, other evaluation studies such as those by Bailey and Livingstone (2008) and Jivraj (2008) have found that migration processes have worked to alleviate concentrations of deprivation in regeneration areas. The results of this analysis cannot be allied to either of these previous findings. Instead the results of the selective migration analysis accord more with those from the repeated cross-sectional analysis for the SARP areas.

I can therefore confirm in relation to the first research question for this chapter that living in a SARP area appears to have no positive or negative impact on the likelihood of being unemployed for SARP area residents compared with residents living in comparator areas that did not receive the programme. In addition, the selective migration analysis indicates that, in terms of the second research question, the likelihood of experiencing unemployment does not significantly differ for varying migrant groups who move out of and into regeneration and comparator areas compared with the 'untreated' remainers in comparator areas. Thus, the findings here do not support the assertion that those who move out of regeneration areas have done so because they have benefitted from the programme in a way that is statistically different from those who did not receive the programme. Further, the characteristics of residents most likely to be unemployed do not

change over the ten year period and are broadly similar to those found in the cross-sectional analysis.

The results here are also particularly disappointing for those residents included in this analysis who did not migrate away from or into SARP areas and stayed in these areas over the ten year period, as in this direct comparison with those who remained in the comparator areas for the duration of the study period, no statistically significant improvement was noted. This of course accords with the findings from the cross sectional analysis and also lends support to the criticisms of the SARP programmes by, for example, Webster (1999) and Turok (2004) outlined earlier in this chapter. Thus, we can begin to adopt the viewpoint that area regeneration strategies to tackle unemployment that focus on supply-side measures may not be enough to alleviate concentrations of unemployment in disadvantaged areas precisely because of a lack of available jobs in these areas. The following section will focus further on this group of residents who remain in SARP areas across the study period by undertaking a further and more sophisticated level of analysis using the Difference in Difference method that assesses whether the programme had any effects on the likelihood of unemployment in the SARP group *net* of the general change reflected in the comparator group over the ten year period between 1991and 2001.

Table 4-4 Logistic regression models predicting the odds of being unemployed for varying migrant groups relative to 'remainers' in comparator areas 1991-2001

Odds of being Unemployed: Selective migration		1991						2001					
Variable	**Category**	**Model D (n= 14795)**		**Model E (n=14795)**		**Model F (n=14795)**		**Model D (n=15052)**		**Model E (n=15007)**		**Model F (n= 14682)**	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Population Groups	2. Comparator Area (1991) to Regeneration Area (2001)	1.14	0.79, 1.64	0.87	0.56, 1.35	0.86	0.55, 1.36	1.15	0.73, 1.79	1.28	0.80, 2.62	1.25	0.76, 2.05
	3. Comparator Area (1991) to Rest of Scotland (2001)	0.92	0.78, 1.08	0.87	0.72, 1.05	0.97	0.79, 1.17						
	4. Regeneration Area (1991) to Comparator Area (2001)	1.91 ***	1.34, 2.82	1.55	0.98, 2.44	1.49	0.93, 2.38	1.24	0.74, 2.06	1.32	0.76, 2.29	1.08	0.60, 1.95
	5. Stayed in Regeneration Area (1991-2001)	0.91	0.80, 1.03	0.96	0.83, 1.11	1.01	0.87, 1.17	0.94	0.79, 1.14	0.94	0.78, 1.12	0.99	0.81, 1.20
	6. Regeneration Area (1991) to Rest of Scotland (2001)	0.85	0.74, 0.98	0.83	0.70, 0.99	0.97	0.81, 1.61						
	7. Rest of Scotland (1991) to Comparator Area (2001)							1.15	0.95, 1.39	1.24	1.01, 1.52	1.06	0.80, 1.23
	8. Rest of Scotland (1991) to Regeneration Area (2001)							1.03	0.87, 1.23	1.19	0.99,1.44	1.12	0.91, 1.37
Age	Age (centred)			1.00	0.99, 1.00	1.00	0.99, 1.00			1.00 *	0.99, 1.00	0.99	0.99, 1.00
Age Squared	Age Squared			1.00	1.00, 1.00	1.00	1.00, 1.00			1.00	1.00, 1.00	1.00	1.00, 1.00

		***		***		*		**	
Sex	Male (reference)	1		1		1		1	
	Female	0.58 ***	0.51, 0.66	0.55 ***	0.48, 0.63	0.54 ***	0.47, 0.62	0.46 ***	0.39, 0.53
Marital Status	Single (reference)	1		1		1		1	
	Married	0.51 ***	0.44, 0.60	0.77 *	0.62, 0.95	0.37 ***	0.31, 0.44	0.76 *	0.61, 0.94
	Widowed	1.45 ***	1.17, 1.79	1.22	0.98, 1.53	0.95	0.75, 1.18	0.85	0.67, 1.09
	Divorced	0.73	0.45, 1.19	0.66	0.40, 1.08	0.79	0.47, 1.32	0.73	0.41, 1.29
Social Class	Professional (reference)	1		1		1		1	
	Managerial	1.88	0.97, 3.64	1.28	0.64, 2.57	1.27	0.73, 2.21	1.18	0.66, 2.10
	Skilled and non-manual	2.60 **	1.35, 4.99	1.34	0.66, 2.72	3.29 ***	1.92, 5.63	2.04 *	1.14, 3.62
	Skilled-manual	4.23 ***	2.23, 8.03	2.01 *	1.00, 4.04	3.71 ***	2.18, 6.32	2.20 **	1.24, 3.90
	Partly-skilled	5.57 ***	2.93, 10.58	2.25 *	1.24, 4.52	5.93 ***	3.49, 10.06	2.80 ***	1.58, 4.97

	Unskilled	6.24 ***	3.25, 11.09	2.19 *	1.08, 4.46	7.46 ***	4.32, 12.88	2.86 ***	1.58, 5.17
	Never worked	161.1 ***	83.04,312.71	54.90 ***	28.83, 112.33	53.21 ***	30.02 94.29	25.15 ***	13.4946.89
Qualification	No qualification and NCR persons under 18 (reference)			1				1	
	Sub-degree			0.63 *	0.42, 0.94			0.64 **	0.48, 0.85
	Degree and higher			0.67	0.43, 1.06			0.49 ***	0.37, 0.65
	Not stated			1.2	0.93, 1.63			0.97	0.63, 1.49
Ethnicity	White (reference)			1				1	
	Non-white			2.99 **	1.50, 5.96			2.20 **	1.37, 3.52
House Tenure	Owner occupied (reference)			1				1	
	Social renting			2.45 ***	2.13, 2.82			2.89 ***	2.48, 3.67
	Private renting			1.84 ***	1.38, 2.47			3.58 ***	2.82, 4.54

Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.70 ***	0.57, 0.85	0.77 *	0.62, 0.94
Car ownership	0 cars (reference)	1		1	
	1 cars	0.45 ***	0.39, 0.51	0.50 ***	0.43, 0.58
	2 cars	0.32 ***	0.25, 0.40	0.42 ***	0.33, 0.53
	3 cars	0.43 ***	0.28, 0.67	0.38 ***	0.24, 0.61
Household type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	1.20	0.96, 1.51	1.60	1.26, 2.04
	One parent families with dependent children	1.20	0.87, 1.65	2.33 ***	1.72, 3.15
	Married and unmarried couples with dependent children	1.52	0.96, 1.37	1.30 *	1.04, 1.64

Log Likelihood	-5914.9257	-4613.9575	-4304.0036	-4425.0833	-3814.1937	-3347.773

* p<0.05, **p<0.01, ***p<0.001

Section 4.9 Difference in Difference (DiD) analysis: net impacts of the SARP programme on unemployment

At this stage, the analytical techniques used in the previous two sections have not uncovered any evidence of a programme effect (positive or negative) on the likelihood of unemployment for regeneration area residents relative to comparator area residents. Furthermore, no evidence has been observed in regards to the likelihood of unemployment (increased or decreased) between different migrant groups and those who remain in regeneration areas relative to residents who remain in comparator areas from 1991 to 2001. In this final empirical section I therefore employ the difference in difference (DiD) approach to investigate the impact of the SARP programme on the likelihood of unemployment from a further longitudinal angle which attempts to account for national trends in unemployment

A full description of the DiD approach is provided in Chapter 3 Data and Methods. To recap briefly in the context of the objectives of this chapter, the DiD approach differs from the previous cross-sectional and longitudinal selective migration analyses by comparing the difference in the likelihood of unemployment among residents in SARP areas before and after the programme with that for comparator area residents. It therefore takes account of the changes occurring both in the treated group and comparator group, in effect the national trend, to identify whether the programme has had any *net* effects on the treated group minus the general change reflected in the comparator group. In this case, it is expected that between 1991 and 2001, even without the SARP programme, the unemployment level would change in the treated and comparator areas reflecting the Scotland-wide change in the labour market. The key advantage of the DiD method is that it accounts for the effects of the programme net from external aspects that may have acted on residents in both SARP and comparator areas and thus impacted on the overall likelihood of experiencing unemployment. These might be, for example, economic growth, or economic crisis, or where people in both groups are growing older (Gutierrez Romero and Noble 2008). The DiD approach can therefore be viewed as the most sophisticated of the three stages of the analysis. In this analysis, only the outcomes for those who remain in SARP and comparator areas for the duration of the study period are considered. The technique is more advanced than the previous two stages of analysis in that it conducts a net impact assessment that determines the effectiveness of the SARP programmes by assessing its unique impact, which is measured by subtracting the effect of non-SARP influences from the total impact (Stevens 2003). Thus the DiD results are of particular interest, in regards to the effectiveness of the SARP programmes, as the estimator has the beneficial property of eliminating the influence of any unobserved and fixed (over time) effects on unemployment.

To return again to the first of the two research questions dealt with in this chapter, we can see that neither of the analyses in the previous two empirical sections has demonstrated any programme effect. I therefore hypothesise (hypothesis 4) that the results from this final analysis will not demonstrate that the SARP programme has had a net positive or negative impact on likelihood of unemployment for residents in the regeneration areas. To recap, this analysis is carried out to compare the difference in likelihood of unemployment in the treated group before and after the regeneration programme with that in the comparator group, and therefore takes the changes occurring both in the treated and comparator groups into account.

In order to investigate hypothesis 4, three fixed-effect regression models are fitted to obtain the DiD estimator. Unemployment is the dependent variable and the analysis investigates whether the programme had any effects on the likelihood of unemployment in the SARP group net of the general change reflected in the comparator group over the ten year period between 1991and 2001. As with the previous analyses, progressively more explanatory variables are added to help identify those factors that affect the likelihood of unemployment:

- Model G: Examines the net effect of the SARP programme with no control for individual or household characteristics.
- Model H: Estimates the net effect of the SARP programme controlling for individual explanatory variables that are expected to impact on the likelihood of an individual experiencing unemployment. These variables are marital status and social class.
- Model I: Adds additional explanatory variables that may act as confounders in the relationship between the SARP programme and the likelihood of individuals experiencing unemployment. These are educational qualifications, housing tenure, car ownership and household type.

Table 4-5 below presents the results of the DiD analysis. Model G shows that after the implementation of the SARP, residents living in SARP areas were significantly less likely to be unemployed than residents living in the comparator areas (OR= 0.58, $p<0.001$). However, the modelling also demonstrates that, once individual characteristics are accounted for, hypothesis 4 is confirmed**.** Thus**,** the programme had no effect on likelihood of unemployment even when the national trend over the period is taken into account. This therefore demonstrates that if individual characteristics are not controlled, the net impact of the SARP programme would be overestimated.

The results from Model H also suggest that individuals who are single are more likely to experience unemployment, which is consistent with what has been observed in the previous two empirical sections.

Model I displays a more notable result in that, with the addition of extra explanatory variables, (qualifications, housing tenure, household type and car ownership) divorced residents are nearly eleven times more likely than single individuals to experience unemployment (OR= 10.96, $p<0.05$). Previous literature has highlighted a causal link between job loss and resultant divorce (Wilkinson and Marmot 2003) and the modelling sequence here shows this significant increase when household type is taken into account. This can be potentially linked to the finding that rises in lone parenthood are due to localised mass unemployment (Webster 2002).

In addition, and similar to earlier findings above, the results show that individuals who rent their homes are more likely to be unemployed than home owners. This is more pronounced for private renters (OR =4.17, $p <0.05$) than those renting social housing (OR= 1.61, $p<0.05$). Again, the results for Model I demonstrate that lone parents are nearly two and a half times more likely than couples without children to experience unemployment (OR =2.46, $p<0.01$), whilst couples with children are less likely than the reference category to be unemployed (OR =0.62, $p<0.05$). This result contrasts with results from the repeated cross-sectional analysis, which found that couples with children are more likely to be unemployed at both the baseline period (OR= 1.21, $p<0.05$) and 2001 (OR= 1.30, $p<0.05$). Finally, the results for Model I show some correspondence with findings from the previous empirical analyses in that individuals who own one car or more are significantly less likely to experience unemployment than those who do not own a car. Therefore, Model I demonstrates that the characteristics most likely to increase the odds of experiencing unemployment are being divorced, renting one's accommodation privately, being a lone parent and not owning a car.

In summary, the DiD estimator confirms hypothesis 4 by showing that the SARP programme had no net positive or negative impact on the likelihood of unemployment for regeneration area residents relative to residents in comparator areas net of all other variables. As mentioned above, the DiD method is the most sophisticated of the three levels of analysis reported in this chapter and these results can therefore be thought of as providing the most rigorous assessment of the impact of the programme for those who lived in SARP areas for the study period. These results do not reflect positively on the SARP strategy to tackle unemployment and indeed suggest that the SARP programme was unable to improve the employment prospects of SARP residents. The conclusion to this chapter will reflect on these findings in greater depth.

Table 4-5 Fixed effect regression models predicting the odds of being unemployed 1991-2001

Odds of being unemployed Difference in Difference

Variable	Category	Model G (n=1300)		Model H (n=1296)		Model I (n=1262)	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**
	Net impact of likelihood of unemployment in SARP areas by 2001 relative to comparator areas	0.58 ***	0.47, 0.71	0.99	0.68,1.44	0.94	0.64, 1.40
	*Dummy variable			0.63 **	0.46, 0.85	0.68 *	0.49, 0.96
	*Treatment variable			1.54	0.70,3.38	1.57	0.68,3.64
Marital Status	Single (reference)			1		1	
	Married			0.36 **	0.18, 0.69	0.51	0.24, 1.07
	Widowed			0.60	0.26, 1.39	0.78	0.32, 1.91
	Divorced			2.78	0.50, 15.47	7.94	0.99, 63.50
Social Class	Professional (reference)			1		1	
	Managerial			0.79	0.19, 3.15	0.67	0.16, 2.81
	Skilled and non-manual			0.66	0.16, 2.65	0.55	0.13, 2.81
	Skilled-manual			0.79	0.20, 3.04	0.63	0.15, 2.16
	Partly-skilled			0.78	0.19, 3.10	0.61	0.14, 2.56
	Unskilled			0.65	0.15, 2.69	0.54	0.12, 2.35
	Never worked			9.49 **	2.05, 43.85	8.79 **	1.79, 43.00
Qualifications	No qualification and NCR Persons under 18 (reference)					1	
	Sub-degree					0.66	0.31, 1.40
	Degree and higher degree					0.84	0.38, 1.87
	Not stated					0.67	0.33, 1.34
House Tenure	Owner occupied (reference)					1	
	Social renting					1.77 **	1.18, 2.67
	Private renting					4.34 *	1.08, 15.95

Household type	Married and unmarried couples with no dependent children (reference)			1	
	Unmarried adult			1.19	0.67, 2.12
	One parent families with dependent children			2.46 **	0.09, 0.63
	Married and unmarried couples with dependent children			0.63 *	0.41, 0.96
Car ownership	0 cars (reference)			1	
	1 cars			0.48 ***	0.34, 0.72
	2 cars			0.38 ***	0.21, 0.64
	3 cars			0.41 *	0.16, 0.85
	Log Likelihood	-419.58805	-373.60643		-348.73088

Dummy variable represents the likelihood of being unemployed over time (2001 vs 1991)
Treatment variable is a dummy variable for living in the SARP areas or in comparator areas through time

* p<0.05, **p<0.01, ***p<0.001

Section 5 Conclusion

The objective of this chapter was to investigate two research questions:

(1) Does living in SARP areas have a positive or negative impact on the likelihood of residents being unemployed compared with similarly deprived residents living in comparator areas that did not receive the programme?
(2) Does the likelihood of being unemployed differ for varying migrant groups, who moved into, out of and remain in SARP treatment areas and comparator areas?

In order to address these questions I conducted three separate sets of empirical analyses: repeated cross-sectional, longitudinal selective migration and Difference in Difference (DiD). Based on the results of these analyses, the overarching finding of the chapter in relation to the first research question is that the SARP programme appears to have had no impact (positive or negative) on an individual's likelihood of unemployment. Referring back to the thesis conceptual framework, this finding therefore indicates that the supply-side approach adopted by the social regeneration side of SARP programmes to combat unemployment has not been successful and thus supports the thesis of Webster (1999) and Turok (2004) who argue that the key to combating unemployment is to concentrate efforts on the demand-side of the employment equation through economic regeneration in order to encourage economic development through investment in disadvantaged areas and ultimately jobs creation.

In regards to the second research question that was addressed by the selective migration analysis, it seems that regeneration area migrants (both in-movers and out-movers) and those who remained in SARP areas over the ten year period had no decreased or increased likelihood of unemployment when compared to residents living in comparator areas throughout the ten years. Thus I find no evidence for moving escalator effects. Bailey and Livingstone (2008) offer two reasons as to why such effects may not be picked up in some analyses. One is that the extent of selective migration may be affected by the stage of an intervention as well as the nature of the intervention. The other is that the declaration of a major regeneration programme for an area may lead to a 'bounce' in demand as people who might have left defer moving to see how the initiative works. This might be followed in later years by raised levels of adverse selective migration where hopes are not subsequently realised (Bailey and Livingstone 2008). I would argue that both of these explanations for not observing a moving escalator effect on unemployment in this analysis can be ruled out in the case of SARP areas. I say this as the treatment areas had been subject to regeneration initiatives for 5 years by 2001, by which time one would imagine individuals who had benefitted from the programme and who were thinking of moving out would have done so. For example, 5 years is the

same period of time in which Andersson and Brama (2004) observed a moving escalator effect in their Swedish study.

In addition to these main findings regarding the impact of the programme on the outcome of interest, a number of conclusions can be drawn about what factors affect the likelihood of unemployment for individuals in disadvantaged areas (both regeneration and comparator) , as a similar pattern emerged in this regard in each of the three analyses for the extended models. Broadly, both the repeated cross-sectional and selective migration analyses found that the characteristics which can increase the likelihood of unemployment are being single, from an ethnic minority, having no educational qualifications, living in accommodation that is rented privately and that is co-habited with others, not owning a car, and having dependent children. The DiD analysis differed slightly in that being divorced and being a lone parent in particular were found to increase the likelihood of unemployment. Moreover, the results for the cross-sectional modelling indicated that many groups of individuals (such as skilled and non-manual, skilled manual, partly skilled, unskilled, home renters, single adults, one parent families and couples with children) in the 2001 snapshot were more likely to be unemployed than those in the reference categories in both regeneration and comparator areas in 1991, while the selective migration analyses indicated that for these groups the likelihood of unemployment increased for the same residents over time from 1991 to 2001. In both cross-sectional and selective migration analyses the increases in the likelihood of unemployment for these types of resident were small, but nevertheless these results indicate that, for some of the most vulnerable individuals, labour market conditions got tougher between 1991 and 2001. This observation is supported by the fact that both cross-sectional and selective migration analyses found that those obtaining higher degree level qualifications became less likely to be unemployed over the ten year period compared to those with no educational qualifications. This leads the discussion back to the debate surrounding the importance of targeting supply-side or demand side aspects when attempting to address unemployment with an area based regeneration strategy. Earlier in this chapter I suggested that a focus on supply issues such as training and job placements were an essential part of the regeneration strategy as, regardless of the number of jobs available, if unemployed individuals in disadvantaged areas did not have the qualifications and skills to make them competitive when applying for a job, then they would remain unemployed. However, Webster (1999) points out that all the groups targeted by initiatives like the SARP programmes (such as youth unemployed, long-term unemployed, long-term sick and lone parents) are concentrated in the same areas of high unemployment and cannot all get back into work unless employment is increased in these areas (Webster 2002).

This underlines the tensions between achieving a workable balance between supply and demand approaches to tackle unemployment. It is widely acknowledged that the SARP programmes focused mainly on supply-side elements when attempting to address unemployment. These results demonstrate that this strategy has not succeeded in Scotland when measured against the likelihood of unemployment experienced by residents living in similarly disadvantaged comparator areas that did not receive the programme.

The following chapter will focus on the impact of the SARP programmes on two measures of morbidity; Limiting Long Term Illness, which acts as a proxy for subjective rating of morbidity, and Hospital Admissions, which is employed as a clinical measure of morbidity.

Chapter 5 The Impact of the Scottish Area Regeneration Partnership Programmes on Morbidity

Section 5.1 Introduction

This chapter follows the unemployment analysis by investigating the impact of the SARP programmes on residents' likelihood of suffering morbidity relative to comparator area residents. Two measures of morbidity are used: a self-reported measure (limiting long term illness) and a clinical measure (hospital admissions). We have seen in Chapter 2 that poor health standards were a key reason for the selection of areas for regeneration in the 1990s (Lawless 2010) and with this in mind, rates of limiting long term illness (referred to as LLTI from this point onwards) have been found to be higher than average in disadvantaged areas (e.g. Bentham et al 1995, Kearns et al. 2009, Minton et al. 2012), as have rates of hospital admissions (e.g. Payne et al. 2013, Saxena et al. 2006, Daly et al. 2000).

In this chapter the two research questions central to the quantitative section of this thesis are investigated with respect to the above stated measures of morbidity: (1) Does living in SARP areas have a positive or negative impact on the likelihood of suffering morbidity compared with living in similarly deprived comparator areas that did not receive the programme? (2) Does the likelihood of suffering morbidity differ across migrant groups, who moved into, out of or remained in SARP treatment areas and comparator areas?

The chapter begins by initially providing an overview of both outcomes and how area based regeneration programmes have attempted to tackle these. The empirical analyses undertaken to investigate the impact of the SARP programmes on morbidity largely mirror those undertaken in Chapter 4. The one major difference is that it was decided to analyse hospital admissions events in the regeneration and comparator areas using two 3 – year time periods. The first of these periods (1991-1994) was selected to provide an understanding of hospital admissions prevalence (period prevalence) in these areas before the regeneration programme commenced in 1996. The second three – year time period selected (2001-2004) would allow an understanding of hospital prevalence in regeneration and comparator areas when the regeneration partnership programme was at the half way stage and beyond.

Firstly, bivariate analyses are reported to explain the unadjusted links between predictor variables and the two outcome variables in use here prior to their inclusion in the multivariate analyses. I then conduct a repeated cross-sectional analysis to ascertain change in likelihood of suffering from LLTI for two different samples of residents in regeneration areas residents relative to comparator area

residents at two points in time; 1991, five years before the programmes started, then 2001, five years after the programmes started (1991-1994 and 2001-2004 for hospital admissions). Following the cross-sectional analysis, I conduct a selective migration analysis. Here I compare the likelihood of experiencing LLTI over the period 1991-2001 (same as above for hospital admissions) for the same sample of residents who move out of, move into or remain in regeneration and comparator areas. The final stage of this analysis further extends the investigation by using a Difference in Differences (DiD) approach to compare the difference in likelihood of suffering from LLTI and hospital admissions in the treated group before and after the regeneration programmes with that in the comparator group.

It is important to note that these analyses are carried out with all members of the sample. The SARPs programmes were intended to benefit all residents in the communities and thus and will provide the main focus of this analysis as the SARP programmes were intended to benefit all residents in the community. The chapter concludes by discussing the key results in relation to the two research questions set out above.

Section 5.2 Morbidity and area-based regeneration

LLTI is defined as a long-term illness, health problem or disability which limits a person's daily activities or the work that they can do, including problems that are due to old age (Equality Commission Northern Ireland 2006). This health indicator was first used in the UK Census in 1991 with a question that asked, 'does the person have any long-term illness, health problems or handicap which limits his/her daily activities or the work he/she can do?' In 2001 the LLTI question was asked again, albeit in a slightly different form; 'do you have any long-term illness, health problem or disability which limits your daily activities or the work you can do?' Boyle et al. (2002) state that since 1991, census data information on LLTI have correlated well with other data on general practitioner consultations and in and out patient visits to hospital in spite of the fact that the question does not provide details of specific illnesses, health problems, or disabilities and handicaps.

Tackling LLTI through area regeneration is important as geographical inequalities exist in regards to LLTI prevalence. For example, males in Scotland experience a gap of between 14 and 17 years for healthy life expectancy (e.g. free from long-term illness) between the least and most deprived decile of areas in Scotland, which in particular severely disadvantages boys born in deprived areas (Kearns et al. 2009). Explanations of the geographically concentrated nature of LLTI have centred on either contextual (climate, water quality, pollution, housing and industrial structure) accounts and/or

compositional (diverse groups of people with differing personal histories and behaviours living in areas) descriptions (Gleave et al. 1997).

Much like self-reported rates of LLTI, hospital admissions have been found to be higher in disadvantaged areas (e.g. Mason and Goldacre 2000) and furthermore hospital admissions data has been stated to correlate well with LLTI census results (Boyle et al. 2002). For example, a recent retrospective study of data from a Scottish cohort (Payne et al. 2013) found that, when compared to the healthiest people living in the most affluent areas, the most physically multimorbid individuals living in the most deprived areas were 18 times more likely to experience an unplanned hospital admission and 51 times more likely to experience a potentially preventable unplanned admission. Furthermore, a cross-sectional study of individual data at primary care trust level in London by Saxena et al. (2006) found that deprivation was associated with increased hospital admission rates for various conditions such as asthma, diabetes, heart failure, hypertension and chronic obstructive pulmonary disease.

At the inception of the first SARP programmes (RP's and PPA's) the idea that area regeneration initiatives could be employed to tackle and improve the social determinants was becoming established (Atkinson et al. 2006, Fyfe 2009). Exemplifying this, LLTI was included among the compulsory health indicators to be targeted for improvement by the SARP programmes and was monitored via a (largely unsuccessful) process of resident surveys in the official evaluation process reported by the Tyler et al. (2001). However, reducing preventable and unscheduled hospital admissions for residents was not an explicitly stated aim of the SARP programme. Nevertheless, it would be expected that efforts to reduce rates of LLTI would impact to some extent on rates of admissions given the correlation between the two outcomes. Indeed, Atkinson et al. (2006) state that:

> "The benefits of including health in the strategy of regeneration are twofold. First there are the direct benefits of improving people's physical and mental health and well-being. Second, are the indirect benefits for employment, quality of life, levels of stress, and the cost of hospital admissions or medicines."

It is the case that the health strategies of holistic area based regeneration initiatives have focused on many of the types of initiatives mentioned above (e.g. Lawless 2010; Kearns et al. 2009). However, it is unclear whether the efforts of programmes such as SARP were sustained enough or delivered in such a way that residents engaged fully with the programme. Official government documentation on SARP programmes has been criticised for failing to provide detailed accounts of how national policies designed to address health inequalities have been implemented at local level (Carlisle 2010).

It is thus difficult to find detail on the exact types of initiatives that have been trialled in SARP areas in particular to improve health, which is one of the key reasons for the qualitative work undertaken for this thesis. Carlisle's (2010) case study in one SARP area in the west of Scotland found that, projects focused on health promoting activities delivered by local statutory service providers, such as providing cheap fruit and vegetables to residents. However, beyond the example of provision of fruit and vegetables it is unclear what initiatives were enacted by those delivering the programme.

At present there is therefore very little robust evidence as to how those living in SARP areas have fared in terms of LLTI at the national level, especially in regards to comparisons with similar individuals that did not receive the programme.

A study by the Tyler et al. (2001) is the only known national level evaluation of SARP programmes to date, however as was noted in Chapter 4, this evaluation was limited in several key ways. Nevertheless, the authors concluded that the incidence of LLTI had increased over the four year study period 1996-2000, which is a finding that tallies with the summary statistics for this study's research sample (see table 3-4 in Chapter 3). For example, those reporting LLTI in regeneration areas numbered 15.73% of the population at baseline in 1991, which grew to 23.13% of the population in 2001; five years after the programmes began. Similarly, in comparator areas the percentage of the population reporting LLTI was 16.85% which rose to 25.28% in 2001. These statistics, whilst limited, provide no indication that the programme impacted positively on morbidity. However, with this in mind, Boyle (2004) suggested that a change to the LLTI question in the UK census between 1991 and 2001 (changing the word 'handicap' to 'disabled' in 2001) may have contributed to the rise in self-reported morbidity rates as there is a degree of stigma associated with the term 'handicap'. Indeed, the summary statistics for hospital admissions do not correspond to the LLTI findings. They demonstrate that admissions to hospital remained stable in SARP areas from 1991 (28.31%) to 2001 (28.91%), whilst in comparator area hospital admissions increased slightly over the study period from 28.5% in 1991 to 30.18% in 2001.

Section 5.3 Bivariate analysis

Bivariate (unadjusted) analyses were conducted initially to investigate the relationships between each independent variable and the LLTI and Hospital Admissions outcome variables before the multivariate analyses were conducted. In regards to LLTI, the bivariate analyses show that older people are more likely to experience LLTI at both 1991 and 2001, whilst women are more likely to experience LLTI at 2001. However the bivariate hospital admissions modelling show that older women are more likely than to be admitted to hospital at both time points. In addition, the results

for LLTI and hospital admissions show that married, widowed and divorced residents are more likely than single individuals to experience LLTI at both time points. This result is somewhat surprising as certain previous literature has found married individuals to be less likely to suffer ill health than singles (e.g. Joung et al. 1997). Thus it will be interesting to observe whether these results are maintained in the multivariate analyses.

All social classes are more likely than professionals residents to experience LLTI and hospital admissions at both time points. Similarly, all economic status categories are more likely to suffer LLTI and to be admitted to hospital at 1991 and 2001 compared with the 'in full-time employment' reference category with the exception of students in 1991 for LLTI and self-employed and students at both time points for hospital admissions. In addition, those with qualifications are less likely to experience LLTI and be admitted to hospital at 1991 and 2001 whilst in addition those residents who are non-white are also less likely to report LLTI and be admitted to hospital at both time points. This is a further interesting result that contradicts examples in previous literature (e.g. Nazroo 1997) that has found non-white residents to be more likely to suffer from LLTI than white residents.

Residents who rent their accommodation are more likely to experience LLTI and be admitted to hospital at 1991 and 2001 and similarly those who live alone at both time points have a greater likelihood of reporting LLTI and being admitted to hospital at both time points. Those residents who have no central heating have a greater likelihood of reporting LLTI at both time points compared to those with centrally heated accommodation, whilst for hospital admissions the picture is somewhat different as the results show that at 2001 residents without central heating are marginally less likely to be admitted to hospital compared with those who have central heating.

In addition, at both time points residents who own one or more cars are less likely to experience LLTI and be admitted to hospital whilst, in regards to household type, at 1991 unmarried adults are less likely to report LLTI than the reference category which is married and unmarried couples with no dependent children, however this category is less likely to be admitted to hospital at both time points. Similarly, one parent families are less likely to report LLTI than the reference category at both time points, and less likely to be admitted to hospital at 2001, whilst married and unmarried couples with dependent children are also less likely than the reference category to report LLTI and hospital admissions at both time points.

Table 5-1 Results from logistic regression modelling predicting the bivariate relationship between each independent variable and the LLTI outcome variable

Bivariate (unadjusted) links between independent variables and LLTI outcome variable		1991 (n=42604)		2001 (n=36389)	
Variable	**Category**	**OR**	**95% CI**	**OR**	**95% CI**
Age	Age (centred)	1.05 ***	1.05,1.05	1.05 ***	1.05,1.05
Age Squared	Age Squared	1.00 ***	1.00,1.00	1.00 ***	1.00,1.00
Sex	Male (reference)	1		1	
	Female	1.02	0.97, 1.07	1.06*	1.01,1.11
Marital Status	Single (reference)	1		1	
	Married	3.13 ***	2.93, 3.35	2.98 ***	2.81,3.16
	Widowed	4.06 ***	3.64, 4.53	4.48 ***	4.09,4.91
	Divorced	9.76 ***	8.94,10.66	11.77 ***	10.73,12.91
Social Class	Professional (reference)	1		1	
	Managerial	2.14 **	1.36,3.37	1.64 ***	1.26,2.14
	Skilled and non-manual	1.96 **	1.25,3.08	1.98 ***	1.52,2.58
	Skilled-manual	3.04 ***	1.94,4.74	3.54 ***	2.73,4.60
	Partly-skilled	3.35 ***	2.14,5.22	3.34 ***	2.57,4.34
	Unskilled	4.26 ***	2.72,6.68	5.04 ***	3.85,6.58
	Never worked	6.31 ***	4.07,9.78	3.41 ***	2.64,4.42
Economic Status	In full-time employment (reference)	1		1	
	In part-time employment	1.53 ***	1.27,1.84	1.66 ***	1.42,1.95
	Self-employed	1.43 *	1.04,1.97	2.02 ***	1.61,2.53
	Unemployed	2.41 ***	2.04,2.84	3.00 ***	2.52,3.57
	Student	0.93	0.80,1.09	1.13	1.00,1.28

				*	
	Permanently sick	38461.42 ***	9579.95,154414.1	436.80 ***	354.74,537.83
	Retired	19.51 ***	17.46,21.81	23.87 ***	21.58,26.40
	Other inactive	5.47 ***	4.81,6.23	7.58 ***	6.79,8.54
Qualifications	No qualification & NCR persons under 18 (reference)	1		1	
	Sub-degree	0.47 ***	0.38, 0.58	0.42 ***	0.35,0.49
	Degree & higher	0.25 ***	0.18,0.34	0.48 ***	0.43,0.53
	Not stated	2.06 ***	1.82,2.32	2.85 ***	2.55,3.18
Ethnicity	White (reference)	1		1	
	Non-white	0.52 ***	0.37,0.73	0.53 ***	0.42,0.66
House Tenure	Owner occupied (reference)	1		1	
	Social renting	2.30 ***	2.17,2.44	2.30 ***	2.19,2.43
	Private renting	1.39 ***	1.20,1.62	1.60 ***	1.46,1.75
Central Heating	Central heating (reference)	1		1	
	No central heating	1.13 ***	1.07,1.20	1.21 ***	1.1,1.32
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.28 ***	0.26,0.30	0.29 ***	0.28,0.31
Car ownership	0 cars (reference)	1		1	
	1 cars	0.44 ***	0.41,0.46	0.74 **	0.62,0.90
	2 cars	0.29 ***	0.25,0.32	0.34 ***	0.28,0.41
	3 cars	0.23 ***	0.17,0.31	0.15 ***	0.12,0.19

Household type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	0.92 *	0.87,0.98	1.02	0.96,1.08
	One parent families with dependent children	0.24 ***	0.20,0.29	0.43 ***	0.38,0.49
	Married and unmarried couples with dependent children (reference)	0.10 ***	0.08,0.13	0.14 ***	0.08,0.15

* p<0.05, **p<0.01, ***p<0.001

Table 5-2 Results from logistic regression modelling predicting the bivariate relationship between each independent variable and the Hospital Admissions outcome variable

Bivariate (unadjusted) links between independent variables and Hospital Admissions outcome variable		**1991 (n=42214)**		**2001 (n=38003)**	
Variable	**Category**	**OR**	**95% CI**	**OR**	**95% CI**
Age	Age (centred)	1.01 ***	1.01,1.01	1.02 ***	1.02,1.02
Age Squared	Age Squared	1.00 ***	1.00,1.00	1.00 ***	1.00,1.00
Sex	Male (reference)	1		1	
	Female	1.06 **	1.10,1.10	1.14 ***	1.09,1.19
Marital Status	Single (reference)	1		1	
	Married	1.47 ***	1.40,1.54	1.85 ***	1.76,1.95
	Widowed	1.66 ***	1.52,1.83	1.98 ***	1.81,2.16
	Divorced	3.13 ***	2.90,3.38	4.40 ***	4.05,4.79
Social Class	Professional (reference)	1		1	
	Managerial	1.67 ***	1.30,2.16	1.34 **	1.10,1.64
	Skilled and non-manual	1.62 ***	1.26,2.09	1.53 ***	1.25,1.87
	Skilled-manual	1.82 ***	1.42,2.35	1.85 ***	1.85,2.26
	Partly-skilled	1.94 ***	1.50,2.50	1.76 ***	1.44,2.15
	Unskilled	2.12	1.63,2.75	2.06	1.67,2.54

		***		***	
	Never worked	2.48 ***	2.93,3.17	1.98 ***	1.63,2.41
Economic Status	In full-time employment (reference)	1		1	
	In part-time employment	1.25 ***	1.14,1.37	1.45 ***	1.30,1.79
	Self-employed	0.97	0.82,1.14	0.9	0.76,1.16
	Unemployed	1.14 **	1.04,1.26	1.14 *	1.04,1.26
	Student	1.03	0.96,1.10	1.1	0.98,1.16
	Permanently sick	3.03 ***	2.77,3.31	4.13 ***	3.86,4.28
	Retired	3.06 ***	2.87,3.27	5.46 ***	5.38, 6.10
	Other inactive	1.80 ***	1.67,1.95	3.41 ***	3.21,4.08
Qualifications	No qualification & NCR persons under 18 (reference)	1		1	
	Sub-degree	0.80 **	0.70,0.91	0.75 ***	0.66,0.84
	Degree & higher	0.59 ***	0.50,0.70	0.65 ***	0.59,0.71
	Not stated	1.38 ***	1.23,1.54	1.75 ***	1.59,1.93
Ethnicity	White (reference)	1		1	
	Non-white	0.55 ***	0.42,0.70	0.62 ***	0.51,0.75
House Tenure	Owner occupied (reference)	1		1	
	Social renting	1.38 ***	1.32,1.45	1.41 ***	1.34,1.48
	Private renting	1.05	0.93,1.18	1.10 *	1.01,1.20
Central Heating	Central heating (reference)	1		1	
	No central heating	1.03	0.98,1.08	0.90 *	0.83,0.99
Persons living in the dwelling	Living alone (reference)	1		1	

	Not living alone	0.56 ***	0.53,0.59	0.74 ***	0.69,0.84
Car ownership	0 cars (reference)	1		1	
	1 cars	0.72 ***	0.68,0.75	0.84 *	0.72,0.99
	2 cars	0.66 ***	0.61,0.71	0.59 ***	0.51,0.69
	3 cars	0.61 ***	0.51,0.73	0.45 ***	0.38,0.53
Household type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	0.92 **	0.87,0.98	0.91 **	0.86,0.96
	One parent families with dependent children	0.99	0.89,1.11	0.78 ***	0.70,0.87
	Married and unmarried couples with dependent children (reference)	0.66 ***	0.60,0.73	0.49 ***	0.44,0.54

* p<0.05, **p<0.01, ***p<0.001

Section 5.4 Repeated cross-sectional analysis

The SARP programmes attempted to address the higher rates of morbidity suffered by residents living in the most disadvantaged areas by improving socio-economic determinants of health such as employment opportunities, housing quality and educational attainment levels (Thomson 2006). However, evidence regarding the success of the SARP programme in this respect is scarce and, in the case of the official evaluation, subject to important data limitations. The purpose of this section is therefore to investigate if, by 2001, the SARP programme had reduced the likelihood of morbidity for residents. A quasi-experimental repeated cross-sectional approach is used to address the first of the two research questions set out in the chapter introduction:

- Does living in SARP areas have a positive or negative impact on the likelihood of residents suffering from morbidity compared with residents living in comparator areas that did not receive the programme?

If the SARP programmes have been successful it would be expected that by 2001 (2004 for the hospital admissions outcome) the regeneration areas would contain residents who are less likely to suffer from morbidity than comparator area residents. However, the two known previous studies

that have sought to gauge how SARP programmes have impacted on LLTI (Tyler et al. 2001); Kearns et al. 2008) did not find any evidence to suggest improvements had been made to LLTI prevalence in regeneration areas. Given these findings, I therefore hypothesise in this section (hypothesis 1) that by 2001 for LLTI and 2004 for hospital admissions, regeneration area residents will display no statistically significant decrease in the likelihood of experiencing morbidity compared with residents in comparator areas.

Section 5.4.1 Modelling

Binary logistic regression models are fitted firstly with LLTI as the dependent variable followed by hospital admissions as the dependent variable for all sample members in order to ascertain the likelihood of suffering from morbidity for people in regeneration areas relative to comparator areas at the two time points for each variable. The reference category is the comparator areas and I add progressively more individual and household explanatory variables to account for further characteristics that may impact on the likelihood of an individual experiencing morbidity. For LLTI the modelling sequence was as follows:

- Model A (1991): includes only for area type: regeneration areas against comparator areas (reference category) at the 1991 baseline.
- Model B (1991): includes the area type (comparator areas (reference category) and regeneration areas), and individual explanatory variables that I expect may impact on the likelihood of an individual experiencing LLTI. These variables are: age, age^2, sex, marital status and social class at the 1991 baseline.
- Model C (1991): includes the area type (comparator areas (reference category) regeneration areas), and extended individual and household explanatory variables in addition to those used in Model B. This model is designed to investigate whether the effect of the SARP programmes in this case is more effectively isolated when accounting for additional characteristics that may impact on the likelihood of experiencing LLTI.
- This modelling sequence was then repeated for 2001, 5 years after the regeneration programme had started.
- This modelling sequence was then repeated for 2001, 5 years after the regeneration programme had started.

In regards to hospital admissions the same modelling sequence was undertaken using the 1991-1994 period as the baseline:

- Model D (1991-1994): considers only area type. I.e. regeneration areas against comparator areas (reference category) at baseline.
- Model E (1991-1994): includes the area type (comparator areas (reference category) and regeneration areas), and individual explanatory variables that I expect may impact on the likelihood of an individual experiencing a hospital admission. These variables are: age, age^2, sex, marital status and social class.
- Model F (1991-1994): includes the area type (comparator areas (reference category) regeneration areas), and extended individual and household explanatory variables in addition to those used in Model B

This was repeated for the 2001-2004 period to assess the likelihood of hospital admission at 5 years after the programme had begun and beyond.

As with chapter 4, sensitivity analyses were conducted for all models. In this case however, the 'permanently sick' category of the economic status variable was dropped in order investigate the justification of the model components presented here given that the 'permanently sick' category may well be heavily correlated with both outcome variables. However, much like the issues alluded to in the precious chapter, the permanently sick category does not wholly coincide with both LLTI and hospital admissions outcomes used here. This category also contains people classed as disabled who may (for example) use a wheelchair which does not necessarily equate to such individuals reporting that they suffer from LLTI or indeed that they will be highly likely to be admitted to hospital. In addition the category can include those who may be blind or deaf who again may not think of themselves as suffering from morbidity.

The results from the sensitivity analyses are shown in Appendix 7 and 8 and demonstrate the rigour of the results presented in this chapter as no differences were observed in any of the main results examining whether likelihood of morbidity differed by area of residence. Thus the model components used in this chapter are well justified. Nevertheless, the results from the sensitivity modelling do show that a few differences were found on the independent variables in certain models. These differences are discussed in the relevant sections below.

Table 5-3 below presents the results from the LLTI modelling whilst Table 5-4 below presents the results from the hospital admissions modelling. The results for both the LLTI and hospital admissions models across the ten year time period appear to confirm hypothesis 1 in that once individual and household characteristics are accounted for, regeneration area residents will display no statistically

significant decrease in the likelihood of experiencing LLTI compared with residents in comparator areas.

In regards to LLTI, the results for Models A-C across the ten year time period appear to confirm hypothesis 1 once individual and household characteristics are accounted for. This hypothesis states that by 2001, regeneration area residents will display no statistically significant decrease in the likelihood of experiencing LLTI compared with residents in comparator areas.

In regards to hospital admissions, the results for Models D-F confirm hypothesis 4 after individual and household characteristics are accounted for. At baseline, (1991-1994) the result for Model J demonstrates no significant differences for SARP area residents relative to comparator. However at the 2001-2004 period, this model shows that SARP area residents are less likely (OR=0.93 $p<0.01$) than comparators to be admitted to hospital. Whilst this result indicates that those living in SARP areas at this point have benefitted from the programme (or perhaps have moved in due to the profile of the area improving) it is nevertheless the case that when I account for further individual and household variables (in Models E and F), this result becomes non-significant.

Returning to the LLTI modelling, at the 1991 baseline, the results for Model A demonstrate that when area only is included , residents in regeneration areas are slightly less likely than comparator area residents to experience LLTI (OR= 0.92, $p <0.01$) and the result for 2001 is broadly similar (OR= 0.89, $p <0.01$). However the baseline result from Models B and C 1991, show that when individual and household characteristics are controlled for the treatment and comparator areas are well matched at baseline, whilst Models B and C 2001 do not show any statistically significant regeneration effect. This therefore implies that not controlling for individual and household characteristics can distort the impact of the SARP programme.

The results for Model B also support hypothesis 1. Here I add several individual-level variables (age, age squared, sex, marital status and social class) to the model to attempt to shed light on how LLTI varies across the study population. The results demonstrate the profile of the individual who is most likely to experience LLTI is consistent across the ten year period. At baseline and in 2001, the person most likely to experience LLTI is an older, widowed male who has never worked. These findings accord with previous literature. It is of course accepted that older individuals will experience more long term illness than younger individuals (Boyle et al. 2002), whilst it also established that women will experience a longer healthy life expectancy than men (Nazroo et al. 2008).

Returning to the results from Model B, when accounting for marital status, widowers and single individuals were the most likely to experience LLTI with widowers being approximately 1.2 times

more likely than single residents to have LLTI across the ten years (OR= 1.21 p<0.01 in 1991 and OR= 1.18 p<0.01 in 2001) which is most probably due to the fact that most widowers will be likely to be older individuals. This is consistent with the findings of Riva et al. 2011 for example, who found that living as a couple, rather than being single, separated/divorced or widowed, was indicative of better health. Riva et al's findings therefore accord with the work here as after widowers, single individuals are the most likely to experience LLTI at both time points with Model B. It is also established that those from lower social classes, such as individuals who have never worked, suffer worse health and also earlier death (Kearns et al. 2009). Indeed the results of this model demonstrate that one's social class is a key driver in predicting the likelihood for residents' in disadvantaged areas to experience LLTI, a result which holds for the populations at 1991 and 2001. For example, in comparison to people in the professional social class, managerial level individuals were just over twice as likely to experience LLTI in 1991 (OR= 2.07 p< 0.01) whilst in the 2001 snapshot this likelihood had fallen to just over one and a half times (OR= 1.56 p<0.001). In addition, skilled and non-manual residents' in the 1991 sample were 2.44 times more likely to have an LLTI (p<0.001) whilst at 2001, and similar to those from managerial classes, this had fallen to 2.07 (p<0.001).

However this pattern of likelihood of LLTI that is shown to slightly decrease by the 2001 snapshot does not hold for those in other social classes. For example, skilled manual individuals are two and a half times more likely than professionals to suffer LLTI in 1991 (OR= 2.51 p<0.001) but this increases for those living in SARP and comparator areas by 2001 slightly to 2.89 times more likely (p <0.001). Similarly, the likelihood of experiencing LLTI for the unskilled is just over three and a half times more likely than professionals (OR=3.57 p<0.001) at 1991, which increased slightly in 2001 to 3.74 times more likely (p< 0.001). Reasons for this are perhaps that those occupying manual positions are more likely to experience illness due to the more physical nature of these occupations. With this in mind, Minton et al. (2012) who investigated adverse relations between social class, health, and economic activity over 37 years in the UK, found that many male unskilled and semi-skilled manual workers with poor health are economically inactive. Thus having a LLTI is significantly disadvantageous for obtaining and retaining work, particularly in manual occupations, the number of which (as we have seen in the previous chapter) have declined considerably over the last thirty years.

However, for partly skilled residents the likelihood of experiencing LLTI fell slightly at 2001 from 3.33 times more likely than the reference category (p <0.001) to 3.10 times more likely (p <0.001) whilst the largest reduction in likelihood of experiencing LLTI was noted for the 'never worked' category from being 8.64 times more likely in 1991 (p< 0.001) to 5.71 times more likely at 2001 (p<0.001).

However despite this, residents who had never worked were of course the most likely of all social classes to experience LLTI.

In regards to hospital admissions, the baseline result for Model E shows the profile of the person most likely to be admitted to hospital in SARP and comparator areas is an older, widowed male who has never worked, which correlates with the results for LLTI and of course with previous literature as mentioned above in the cross sectional section of the LLTI analysis. This profile is maintained in the 2001-2004 survey also. Again we observe at both time points married residents are more likely to experience morbidity compared to single residents (1991-1994: OR=1.32 p<0.001; 2001-2004 OR= 1.27 p<0.001) which is contrary to the LLTI cross sectional results. Another result that is contrary to the cross sectional modelling for LLTI at both time periods is that divorced residents are more likely to be admitted to hospital than those who are single (1991-1994: OR=1.38 p<0.001; 2001-2004: OR=1.31 p<0.001). In regards to social class, the results replicate what has been found for LLTI. The main difference is that the size of effects for hospital admissions are reduced compared to those for the LLTI cross sectional modelling at baseline. In addition, all social class categories reduce their likelihood of hospital admission relative to the reference category (professionals) from 1991 to 2001, which also diverges from the LLTI results that show those from the lowest social classes (except those who have never worked) increase in likelihood of LLTI from 1991 to 2001.

Returning to the LLTI modelling, the impact of social class on the likelihood of LLTI diminishes in Model C (1991) and (2001) with the addition of further individual and household variables (economic status, educational qualifications, ethnicity, housing tenure, persons resident in the dwelling, car ownership and household type) that may further explain how likelihood of LLTI varies across the population in SARP and comparator areas at 1991 and then 2001. The central driver for the attenuation of the effect of social class is the addition of economic status to the model as these two variables are highly correlated.

At baseline, the effect of social class attenuates markedly from Model B's baseline model when these additional explanatory variables are added. Only those who have never worked are now significantly more likely than professional individuals to experience LLTI (OR= 1.83 p <0.05). In the 2001 model the results for those in higher social class categories (managerial and skilled and non-manual groups) become non-significant, whilst the effect sizes and significance levels for the remaining categories noticeably reduce (skilled manual (OR= 1.44 p< 0.05), partly skilled (OR= 1.40 p< 0.05) unskilled (OR= 1.44 p< 0.05) never worked (OR= 1.66 p< 0.05). The fact that these categories remain significantly more likely than professionals to experience LLTI accords with

previous literature that states lower social classes and lower ranking staff are likely to experience more disease (Kearns et al. 2009).

Model C again demonstrates that there is no significant difference for residents in regards to the likelihood of experiencing LLTI in regeneration areas compared to comparator areas at 2001, which lends further support to hypothesis 1. The profile of the type of individual who is most likely to report LLTI is also mostly consistent at both 1991 and 2001. In addition to the finding from Model B that at baseline, older, widowed males are the most likely to be experience LLTI in SARP and comparator areas, Model C 1991 indicates that retired residents with no access to a car, who reside in social rented accommodation and who are part of a couple with no dependent children are the most likely to suffer from LLTI. We know from the discussion of results from Model B that older residents are more likely to experience LLTI. It is therefore unsurprising that these results indicate that a characteristic of the individual most likely to be unemployed is being retired. However, beyond retired individuals, Model C shows that in terms of economic status, the unemployed are most likely to report LLTI at the time of both cross sectional waves, which in terms of effect size increases from 1991 (OR= 1.72 p< 0.001) to 2001 (OR= 2.45 p<0.001). An increase in likelihood of reporting LLTI from 1991 to 2001 is also found amongst all other economic categories with the exception of the permanently sick and other inactive individuals. With this in mind, Boyle (2004) suggested that a change to the LLTI question in the UK census between 1991 and 2001 (changing the word 'handicap' to 'disabled' in 2001) may have contributed to the rise in self-reported morbidity rates as there is a degree of stigma associated with the term 'handicap'. However in other studies independent of the UK census such as that by the Tyler et al. (2001), the (albeit limited) findings mentioned earlier in this chapter reported that self-rated LLTI worsened over the study period. However, the wording of the study question on LLTI is unclear. In addition, Norman and Bambra (2005) point out that the despite the fact that a significant body of work exists to validate the self-reported health aspects of the UK census, the results are still potentially affected by subjective factors with "reporting dependent on the perception of, recall of, and propensity to report, health problems" (Norman and Bambra 2005). With that said the second half of this chapter investigates the impact of the SARP programmes on the likelihood of hospital admissions in order to provide a clinical measure of morbidity. However, it is accepted that self-reported incidence in LLTI rose in the UK between 1991 and 2001 in industrial and manufacturing areas (Marshall 2011). Beyond the changing LLTI question in the census Marshall (2011) suggests that explanations for this have included migration, (e.g. the healthiest and most likely to be employed have moved to less deprived areas and are replaced with more deprived people) or health expectations (e.g. people have become more likely to consider themselves ill) or hidden unemployment (e.g. the benefits system and the

employment services have diverted people away from unemployment benefits and onto sickness benefits) or finally, the health of individuals (e.g. that increases in rates of LLTI at the older ages in certain areas might reflect an expansion of morbidity where people live longer but spend greater proportions of their lives with illness but these gains in life expectancy are composed of additional years of illness) (Marshall 2011).

Model C at baseline also suggests that living in socially rented accommodation is a further characteristic of the person most likely to report LLTI in that these individuals are almost 1.4 times more likely than homeowners to report LLTI (OR= 1.39 p< 0.01), which is a finding that is again seen in the 2001 survey. However again the effect size increases to above 1.5 times more likely (OR=1.55 p< 0.001) than homeowners to report LLTI. Furthermore, the results at baseline show that car ownership is significant in that those who do not own a car are more likely to report LLTI than those who do own a car. This is observed again in 2001. Supporting these finding, (stated in Chapter 2) Wiggins et al. (2002) found that car and home ownership were useful markers of social and material advantage that protecting against the risk of reporting LLTI. Furthermore, in regards to household type, at baseline and in 2001 couples with no dependent children are more likely than couples with children and lone parent families to report LLTI. However the effect sizes and significance levels observed at 1991 (couples with children OR= 0.65 p< 0.001; lone parents OR= 0.55 p< 0.001) attenuate at 2001 (couples with children OR= 0.81 p< 0.01; lone parents OR= 0.78 p< 0.05). These findings may again reflect that couples in the sample with no dependent children are older individuals with grown up children as one would perhaps expect lone parents to be more likely to experience illness given that the previous chapter found that lone parents were more likely to be unemployed than couples without dependent children and the associations between unemployment and ill health (e.g. Begum 2004).

Finally, the results from Model C 1991 and 2001 display one result that is not consistent across the two cross-sectional time points in regards to marital status. At baseline widowers were the most likely to report LLTI compared to single individuals (OR=1.37 p< 0.01), whereas in 2001 it is married individuals that are the most likely to report LLTI compared with single residents (OR= 1.31 p< 0.01). At 2001 widowed individuals are still more likely than single people to report LLTI (OR= 1.27 p< 0.01) whilst in addition, divorced residents also are also significantly more likely to report LLTI at 2001 (OR=1.28 p<0.01) a result which was not found in 1991. The fact that married individuals become the most likely of these categories to report LLTI in 2001 corresponds to the bivariate analysis above and is therefore surprising as marriage is often found to be associated with improved health outcomes compared with single individuals (e.g. Joung et al. 1997). Indeed, Model B 1991 and 2001

demonstrated that married individuals were less likely to report LLTI at both 1991 and 2001, whilst similarly the previous chapter found that married people were significantly less likely to be unemployed compared with single individuals. This result is therefore contrary to what we may expect. However, the result may be due to the household type being entered into the model. This variable refers to a person's position in a household and it is therefore equivalent to an interaction of marital status with other household members. We can see that within the household type variable that married and unmarried couples with dependent children have a 0.81 (OR), in comparison with married/unmarried with no children at baseline. To combine these two together, married without children has higher risk of LLTI in comparison to singles.

In regards to Model F (where additional variables are added to the model to shed light on how the risk of hospital admission varies across the study population) there is no significant difference in regards to likelihood of being admitted to hospital for SARP area residents relative to comparators at both time points which lends further support to hypothesis 1. However in this case, the profile of the type of individual who is most likely to be admitted to hospital is not altogether consistent at both time periods. To illustrate, at baseline (1991-1994), the person most likely to be admitted to hospital is an older, widowed male who is permanently sick, rents social housing and lives alone. However, in addition there is a surprising finding that in regards to social class, Model D at baseline shows that managerial residents are the most likely social class to be hospitalised, which is contrary to a range of previous literature that has found those from lower social classes to be most likely to be in ill health (Asthana et al. 2004). However, at the 2001-2004 period the results show no significant differences across social classes.

At the 2001-2004 period the profile of the person most likely to be admitted to hospital is an older, married and permanently sick individual with no qualifications. However in addition to this the household type variable shows that being a single parent is a strong indicator of likelihood for hospital admission. This was not found in the LLTI cross sectional analysis and of course contradicts the finding in the same model that those who are married are most likely to be admitted to hospital. A further difference from the baseline model is that those with no central heating are less likely to be admitted to hospital (OR=0.88). Finally, this model demonstrates that economic status is the major predictor of the likelihood of being admitted to hospital for those who are permanently sick, retired or other inactive groups who all become more likely in the 2001-2004 sample to be admitted to hospital compared with individuals who are full-time employed.

These results for the repeated cross sectional modelling demonstrate that this analysis supports the hypothesis (hypothesis 1) which contends that by 2001, regeneration area residents would report no

statistically significant decrease in the likelihood of experiencing LLTI relative to residents in comparator areas. Also, the profile of the individuals most likely to report LLTI remains largely stable from 1991 to 2001. Following this conclusion, I can state in response to the first research question of this chapter that living in a SARP area appears to have had no positive or negative impact on the likelihood of reporting LLTI for residents compared with residents living in similarly deprived comparator areas that did not receive the programme.

Nevertheless, as has been outlined earlier in this thesis, the repeated cross sectional approach is limited in that it cannot account for changes in the resident population in both SARP and comparator areas over time. Thus, it is feasible that the inability of the modelling outlined above to note any regeneration impact may be attributable to the possibility that those who were originally intended to benefit from the programme may have had their life chances improved and moved out to other less deprived areas and in turn been replaced in the regeneration areas by more disadvantaged residents. This can therefore have the effect of creating stagnation in the deprivation profile of the area.

Thus, so that the changing experiences of those originally intended to benefit from the SARP programmes can be more securely related to the regeneration processes that they experience, I will in the next section conduct a selective migration analysis to investigate whether the cross sectional results may have been due to moving escalator processes, and ultimately to assess whether those who moved out of regeneration and comparator areas were less likely to report LLTI, and whether those who moved in were more likely to report LLTI.

Nevertheless, as has been outlined earlier in this thesis, the repeated cross sectional approach is limited in that it cannot account for changes in the resident population in both SARP and comparator areas over time. Thus, it is feasible that the inability of the modelling outlined above to note any regeneration impact may be attributable to the possibility that those who were originally intended to benefit from the programme may have had their life chances improved and moved out to other less deprived areas and in turn been replaced in the regeneration areas by more disadvantaged residents. This can therefore have the effect of creating stagnation in the deprivation profile of the area.

Thus, so that the changing experiences of those originally intended to benefit from the SARP programmes can be more securely related to the regeneration processes that they experience, I will in the next section conduct a selective migration analysis to investigate whether the cross sectional results may have been due to migratory processes.

Table 5-3 Repeated cross-sectional logistic regression models predicting the odds of experiencing LLTI in regeneration areas relative to comparator areas

Cross sectional: Limiting Long Term Illness		1991						2001					
Variable	**Category**	**Model A (n= 42604)**		**Model B (n=42604)**		**Model C (n= 42604)**		**Model A (36442)**		**Model B (n=36274)**		**Model C (n=34884)**	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Area Type	Control area (reference)	1		1		1		1		1		1	
	Regeneration area	0.92**	0.87, 0.97	0.94	0.89, 1.00	0.96	0.89, 1.03	0.89***	0.85, 0.93	0.97	0.91, 1.02	1.02	0.95, 1.10
Age	Age			1.06***	1.06, 1.06	1.03***	1.03, 1.04			1.06***	1.06, 1.06	1.03***	1.03, 1.04
Age Squared	Age Squared			0.99***	0.99, 0.99	1.00	0.99, 1.00			0.99***	0.99, 0.99	0.99	0.99, 1.00
Sex	Male (reference)			1		1				1		1	
	Female			0.67***	0.63, 0.72	0.79***	0.72, 0.86			0.91**	0.85, 0.96	0.84***	0.78, 0.91
Marital Status	Single (reference)			1		1				1		1	
	Married			0.81***	0.74, 0.89	1.2	0.99, 1.46			0.71***	0.65, 0.77	1.31**	1.13, 1.53
	Widowed			1.21**	1.06, 1.37	1.37**	1.14, 1.65			1.18**	1.06, 1.32	1.27**	1.09, 1.48
	Divorced			0.88*	0.79, 0.99	1.11	0.96, 1.29			0.86*	0.76, 0.98	1.28**	1.09, 1.49
Social Class	Professional (reference)			1		1				1		1	
	Managerial			2.07**	1.31, 3.28	1.42	0.81, 2.49			1.56**	1.18, 2.05	1.29	0.93, 1.79
	Skilled and non-manual			2.44***	1.54, 3.85	1.33	0.75, 2.33			2.07***	1.57, 2.73	1.25	0.89, 1.75

	Skilled-manual	2.51 ***	1.60, 3.95	1.14	0.65, 2.01	2.89 ***	2.20, 3.79	1.44 *	1.03, 2.02
	Partly-skilled	3.33 ***	2.12, 5.23	1.29	0.73, 2.27	3.10 ***	2.37, 4.07	1.40 *	1.00, 1.96
	Unskilled	3.57 ***	2.26, 5.65	1.2	0.67, 2.13	3.74 ***	2.84, 4.95	1.49 *	1.05, 2.11
	Never worked	8.64 ***	5.53, 13.52	1.83 *	1.05, 3.21	5.71 ***	4.34, 7.52	1.66 **	1.17, 2.34
Economic Status	In full-time employment (reference)			1				1	
	In part-time employment			1.46 ***	1.19, 1.78			1.53 ***	1.30, 1.82
	Self-employed			1.31	0.94, 1.81			1.83 ***	1.45, 2.32
	Unemployed			1.72 ***	1.44, 2.06			2.45 ***	2.03, 2.96
	Student			1.73*	1.12, 2.67			2.21 ***	1.73, 2.83
	Permanently sick			21452.48 ***	5335, 86246			247.34 ***	199.23, 307.06
	Retired			3.39 ***	2.88, 4.00			5.30 ***	4.54, 6.17
	Other inactive			2.82 ***	2.37, 3.35			5.34	4.70, 6.08
Qualifications	No qualification and NCR persons under 18 (reference)			1				1	
	Sub-degree			0.77	0.58, 1.03			1.08	0.88, 1.33

	Degree and higher	0.71	0.47, 1.07	1.01	0.86, 1.18
	Not stated	1.04	0.87, 1.24	0.94	0.80, 1.11
	Over 75 with qualification	1.03	0.88, 1.21	0.99	0.82, 1.21
Ethnicity	White (reference)	1		1	
	Non-white	1.43	0.93, 2.19	0.92	0.69, 1.24
House Tenure	Owner occupied (reference)	1		1	
	Social renting	1.39 ***	1.27, 1.52	1.55 ***	1.42, 1.68
	Private renting	1.20 *	0.97, 1.48	1.47 ***	1.28, 1.69
Central Heating	Central heating (reference)	1		1	
	No central heating	0.96	0.89, 1.05	1.08	0.94, 1.23
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.92	0.81, 1.05	0.97	0.85, 1.10
	0 cars (reference)	1		1	
Car ownership	1 cars	0.82 ***	0.75, 0.90	0.84 ***	0.77, 0.91
	2 cars	0.85	0.71, 1.01	0.69 **	0.61, 0.80

	3 cars			0.66	0.43, 1.01				0.78	0.60, 1.01
Minimal household unit	Married and unmarried couples with no dependent children (reference)			1					1	
	Unmarried adult			1.09	0.90, 1.33				1.13	0.95, 1.33
	One parent families with dependent children			0.55 ***	0.41, 0.74				0.78 *	0.73, 0.95
	Married and unmarried couples with no dependent children			0.65 ***	0.55, 0.76				0.81 **	0.71, 0.93
	Log Likelihood	-18997.777	-14897.515		-10288.983	-20104.804	-15674.651			-11194.508

* p<0.05, **p<0.01, ***p<0.001

Table 5-4 Repeated cross-sectional logistic regression models predicting the odds of experiencing a hospital admission in regeneration areas relative to comparator areas

Hospital Admissions		1991						2001					
Variable	**Category**	**Model A (n= 42214)**		**Model B (n=42214)**		**Model C (n=42214)**		**Model A (n=38058)**		**Model B (n=37670)**		**Model C (n=35754)**	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Area Type	Comparator area (reference)	1		1		1		1		1		1	
	Regeneration area	0.99	0.95, 1.03	1	0.96, 1.04	1.01	0.97, 1.06	0.93 **	0.89, 0.98	1	0.93, 1.02	0.99	0.94, 1.04
Age	Age			1.01 ***	1.01, 1.01	1.00 *	1.00, 1.00			1.02 ***	1.01, 1.02	1.00 **	1.00, 1.00
Age Squared	Age Squared			1.00 ***	1.00, 1.00	1.00 *	1.00, 1.00			1.00 ***	1.00, 1.00	1.00 ***	1.00, 1.00
Sex	Male (reference)			1		1				1		1	
	Female			0.95 *	0.90, 0.99	0.90 ***	0.85, 0.94			1.05 *	1.00, 1.11	1	0.95, 1.05
Marital Status	Single (reference)			1		1				1		1	
	Married			1.32 ***	1.23, 1.41	1.30 ***	1.17, 1.45			1.27 ***	1.18, 1.36	1.37 ***	1.24, 1.51
	Widowed			1.62 ***	1.46, 1.81	1.41 ***	1.26, 1.58			1.42 ***	1.28, 1.57	1.33 ***	1.18, 1.52
	Divorced			1.38 ***	1.24, 1.53	1.30 ***	1.16, 1.46			1.31 ***	1.17, 1.47	1.34 ***	1.23, 1.56
Social Class	Professional (reference)			1		1				1		1	
	Managerial			1.57 **	1.21, 1.03	1.43 **	1.09, 1.87			1.23 *	1.00, 1.51	1.10	0.89, 1.36

	Skilled and non-manual	1.61 ***	1.24, 2.08	1.33 *	1.01, 1.76	1.40 **	1.14, 1.72	1.10	0.87, 1.35
	Skilled-manual	1.63 ***	1.27, 2.11	1.36 *	1.03, 1.79	1.57 ***	1.28, 1.92	1.20	0.93, 1.45
	Partly-skilled	1.82 ***	1.41, 2.35	1.42 *	1.07, 1.87	1.55 ***	1.27, 1.91	1.10	0.88, 1.37
	Unskilled	1.80 ***	1.39, 2.35	1.41 *	1.06, 1.87	1.58 ***	1.27, 1.96	1.10	0.85, 1.35
	Never worked	1.95 ***	1.51, 2.51	1.41 *	1.07, 1.87	1.63 ***	1.34, 2.01	1.20	0.92, 1.46
Economic Status	In full-time employment (reference)			1				1	
	In part-time employment			1.18 ***	1.07, 1.30			1.18 **	1.06, 1.31
	Self-employed			0.91	0.77, 1.08			0.82 *	0.69, 0.97
	Unemployed			1.07	0.96, 1.18			1.10	0.98, 1.30
	Student			0.88	0.71, 1.09			0.87 ***	0.74, 1.03
	Permanently sick			2.36 ***	2.14, 2.62			2.71 ***	2.46, 2.99
	Retired			1.32 ***	1.18, 1.47			1.45 ***	1.28, 1.63
	Other inactive			1.32 ***	1.19, 1.46			1.45 ***	1.32, 1.59
Qualifications	No qualification and NCR Persons under 18 (reference)			1				1	

	Sub-degree	0.93	0.81, 1.08	1.00	0.86, 1.11
	Degree and higher degree	0.87	0.72, 1.05	0.82 **	0.74, 0.92
	Not stated	1.12 *	1.00, 1.26	1.00	0.88, 1.14
	Over 75 with qualification	1.01	0.88, 1.16	1.00	0.82, 1.14
Ethnicity	White (reference)	1		1	
	Non-white	0.71 **	0.55, 0.92	0.90	0.72, 1.09
House Tenure	Owner occupied (reference)	1		1	
	Social renting	1.14 ***	1.08, 1.20	1.17 ***	1.10, 1.24
	Private renting	1.01	0.89, 1.14	1.10	0.98, 1.20
Central Heating	Central heating (reference)	1		1	
	No central heating	0.98	0.93, 1.03	0.88 *	0.79, 0.97
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.83 **	0.76, 0.91	0.90 *	0.82, 0.99
	0 cars (reference)	1		1	
Car ownership	1 cars	0.97	0.92, 1.03	1.00	0.92, 1.04

	2 cars			1.05	0.96, 1.15			1.00	0.87, 1.04
	3 cars			1.02	0.84, 1.23			1.15	0.90, 1.25
Minimal household unit	Married and unmarried couples with no dependent children (reference)			1				1	
	Unmarried adult			0.9	0.81, 1.01			0.92	0.83, 1.03
	One parent families with dependent children			1.40 ***	1.21, 1.61			1.20 **	1.05, 1.38
	Married and unmarried couples with dependent children			1.02	0.94, 1.10			1.00	0.95, 1.13
	Log Likelihood	-25212.914	-24220.21		-23958.484	-23031.123	-21367.82		-20892.9

* p<0.05, **p<0.01, ***p<0.001

Section 5.5 Selective Migration analysis: likelihood of experiencing morbidity over time for remainers, out-movers and in-movers

Retaining the population in a regeneration area is crucial to the success of the programme as the value and benefit of regeneration resources can only fully be realised by concentrating effort on a stabilised population (Tarling et al. 1999). However, disadvantaged areas generally tend to have a more mobile population than other areas (Blackman 2006) and in terms of health, previous research has found that migration is also an important determinant of population health in an area, in that healthy people tend to migrate away from the most disadvantaged areas whilst unhealthy people migrate to the most disadvantaged areas (Boyle et al. 2002; Norman et al. (2005). However, despite much investigation to date, the impact of migration on inequalities in health remains inconclusive (Crawford 2011).

We know from earlier discussion in this thesis that migration may be influenced, either directly or indirectly, by a policy intervention such as area regeneration. For example, individuals resident in intervention areas who benefit from programme activities for example by acquiring new skills so allowing them to seek better-paid employment – may seek to move out to a 'better' area, and be replaced by individuals who are more deprived and less likely to be in good health. Conversely, new-build housing developments within NDC areas may lead to gentrification and an influx of a more affluent (and healthier) population (Cotterill et al. 2008). Most of the concern regarding regeneration and migration has focused on the first of the scenarios outlined above, i.e. that people will move out after having their life chances improved through exposure to the programme and be replaced by less well-off individuals, whilst the second scenario (gentrification) has been largely desired by those implementing regeneration policies (Crawford 2011)

Very few studies have been able to comparatively track the health outcomes over time of out-movers, in-movers and remainers in regeneration and comparator areas in order to understand what happened to those residents originally intended to benefit from regeneration activities. However, a few studies have had some success in tracking residents through time. For example, Huxley et al's controlled study from 2004 found that after 22 month follow-up residents who moved out of a Single Regeneration Budget (SRB) area scored better than those who remained on a General Health Questionnaire (GHQ12). In addition, Cole et al's (2007) evaluation of the English New Deal for Communities (NDC) programmes that largely mirrored the SIP phase of the SARP programmes in Scotland (in terms of holistic strategy and targets for improvement) found evidence to suggest that both in-movers and out-movers were healthier than remainers, whilst moving out of NDC areas was associated with improvements to health and socio-economic status compared with remainers.

However the results for out-movers in this study in particular were limited due to small numbers, thus no inferential statistics were used, only descriptive techniques. The study was also limited in that the counterfactual was not assessed. In addition, given the strong associative links between socio-economic status and health (Blackman 2006) we can also look at the evidence from studies investigating the impact of regeneration on migration and employment. For example, as mentioned in the previous chapter, Andersson and Brama's evaluation in Sweden found clear evidence that those who move out were more likely to be employed and we can infer therefore, healthier. In addition Cole et al's study concluded that evidence of a moving escalator effect existed in that those in jobs and who were in, or who intend to enter, the owner-occupied sector were being replaced by those who are less likely to be in employment and who more likely to be relatively less well-off and to live in rented accommodation (Cole et al. 2007).

However, the empirical selective migration analysis on unemployment carried out in the previous chapter of this thesis found no evidence to suggest that those who moved out of (or into) SARP areas were more likely than comparator residents to be employed. The results of the repeated cross sectional work above may well suggest that a moving escalator process has occurred in terms of health selective migration in SARP areas as the analysis could not detect any significant difference between SARP and comparator areas at 2001 on likelihood of experiencing morbidity. However, the results from the previous chapter would suggest that this is not so, given the above stated links between employment and health. Therefore for the following analyses I hypothesise (hypothesis 2) that:

- Those who move out of or into regeneration areas will have no significantly different likelihood of experiencing morbidity relative to the reference category (residents who remain in comparator areas from 1991-2001).

To test this hypothesis I again use the nine-category variable created to model variations in migration between regeneration areas, comparator areas and other areas in Scotland, and to identify residents who remained in both regeneration and comparator areas throughout the ten year period. To recap, the variable identifies SLS members at their origin in 1991 and their destination in 2001. For example, category 2 identifies those SLS members who lived in a comparator area in 1991 but by 2001 they had moved out and were living in a SARP area.

Population group categories for selective migration analysis

1	Remain in Comparator area (1991-2001)
2	Comparator area (1991) to Regeneration area (2001)
3	Comparator area (1991) to area in the rest of Scotland (2001)
4	Regeneration area(1991) to Comparator area (2001)
5	Remain in Regeneration area (1991-2001)
6	Regeneration area (1991) to area in the rest of Scotland (2001)
7	Rest of Scotland (1991) to Comparator Area (2001)
8	Area in the rest of Scotland (1991) to Regeneration Area (2001)
9	Rest of Scotland (1991) to area in the rest of Scotland (2001)

This analysis is undertaken to investigate second of the thesis research questions:

- Does the likelihood of suffering morbidity differ across migrant groups, who moved into, out of, or remained in SARP treatment areas and comparator areas?

Logistic regression models were fitted to investigate the odds of experiencing morbidity for the differing migrant groups and for remainers in regeneration areas compared to remainers in comparator areas. To recap from Chapter 4, in the 1991 models, groups 7, 8 and 9 were purposely removed from the analyses as these groups were not resident in either a regeneration or comparator area in 1991 and were therefore neither residents that were originally intended to benefit from SARP, nor matched comparator residents and thus not relevant to the analysis. Similarly, groups 3, 6 and 9 were removed from the 2001 models as residents in these areas were not in a regeneration or comparator area at this point in time and were again not relevant to the analysis. The modelling was conducted in to the same way as that conducted for the repeated cross sectional analyses above.

Table 5-5 below presents the results of the selective migration analysis for the LLTI outcome, whilst Table 5-6 presents the results for hospital admissions. Overall the results for the LLTI modelling across the ten year time period demonstrate that once individual and household characteristics are controlled for, hypothesis 2 (those who move out of or into regeneration areas will have no significantly different increased or decreased likelihood of reporting LLTI relative to the reference category) is supported. However, Model G which has no control for individual characteristics shows that all categories are less likely than the remainers in comparator areas to be in ill health at both 1991 and 2001. This is consistent with findings that suggest all movers are likely to be in better health than non-migrants (Boyle 2004). However, the results for those who remain in SARP areas across the ten years also demonstrate that these non-migrating individuals are less likely to be ill. Nevertheless, the extended control models H and I largely uphold hypothesis 2, which demonstrates that failure to control for additional variables, can overestimate the extent of differences in LLTI likelihood between the reference and other groups.

In regards to hospital admissions, the results do not support hypothesis 2 and are therefore contrary to the results for the LLTI self-report measure. However, this is only the case for baseline models' K and L which demonstrate that even when individual and household characteristics are accounted for, people who moved out of comparator areas to rest of Scotland, and from regeneration to control, and from regeneration to rest of Scotland, were more likely to be hospitalised between 1991-1994. With Model K for example we observe a highly significant result that suggests that those who move out of areas that were to be chosen as SARP areas (to the rest of Scotland) are more likely to be admitted to hospital than comparators (OR=1.11, $p<0.001$). In addition, the model also finds that those who move from comparator areas to areas in the rest of Scotland are more likely to be ill than comparator area residents (OR=1.12 $p<0.05$). In addition Model K also shows that those who move out of SARP areas to comparator areas are also more likely to be admitted to hospital than comparators (OR=1.30, $p<0.05$).

These are surprising results that contradict previous literature mentioned above in the LLTI section such as Boyle (2004) and Marshall (2011) which suggests that healthy individuals are more likely to move out of deprived areas. However Boyle et al. (2002) also suggests that older migrants tend to be less healthy. Thus it may be the case that these migrants who were more likely to be ill are older and may have moved out to places where they had better access to health care or perhaps closer to relatives. However it is beyond the scope of the dataset used here to investigate this. In addition, it may be that these individuals had been re-housed within social housing to make allowances for disability. For example, they may have moved to housing with adaptations or a bungalow.

In addition to these baseline results, Model J (2001-2004) shows several significant results for categories 4 (SARP to comparator), 5 (remained in SARP area), 7 (rest of Scotland to comparator) and 8 (rest of Scotland to SARP) with each category showing that SARP residents are less likely to be admitted to hospital than comparators. However, with the addition of explanatory variables (age, age squared, marital status and social class in Model K 2001-2004,the significance of these results diminishes and in the case of categories 7 and 8, the direction of the effect actually reverses. Thus those have moved into SARP and comparator areas from area in the rest of Scotland are more likely than comparators to be admitted to hospital. This result chimes with the workings of the moving escalator theory, however there is no evidence to suggest in Model K (2001-2004) that those who move out are less likely to be hospitalised. Moreover, when additional variables are added in the full model (Model L 2001-2004) these results become non-significant.

In regards to the results for the research population, Model K at baseline shows that the profile of the person most likely to be hospitalised is older, widowed and partly skilled. The 2001-2004 output for Model K differs in that women become more likely than men to be hospitalised (OR=1.05), a result that is marginally significant ($p<0.05$). However the model remains stable from the baseline period in that being older and widowed are key characteristics that predict likelihood of hospitalisation. However in the 2001-2004 period those who have never worked become the most likely to be hospitalised compared to professional residents.

Returning to the LLTI results, Model H (2001) indicates that those who were residing in comparator areas, having moved from areas in the rest of Scotland, were more likely to be ill than comparator residents (OR= 1.13) a result which was marginally significant ($p<0.05$). With that in mind, Bailey et al. (2012) state that moving into a deprived area is usually the result of a highly constrained choice (or no choice) for many people, presumably meaning that such a move will be heavily based on a downturn in the financial situation of an individual such as a job loss, which may have a negative impact on health. However when the additional variables are added in Model F this result is no longer statistically significant.

In regards to the study population, the results here are largely similar to those observed in the repeated cross sectional analysis. Thus, the explanatory variables for Model H (1991 and 2001) show that the individual most likely to suffer from LLTI is an older, single male who has never worked. The central difference between these models and their cross sectional counterparts is that here widowed individuals are not significantly more likely than single residents to experience LLTI at baseline. However this does occur by 2001 (OR=1.17, $p< 0.01$) but this does not alter the fact that the most significant result in terms of marital status across the ten years is that married individuals

are less likely to experience LLTI compared with single residents. Social class again plays a significant roles in reporting likelihood of LLTI in Model H which does not change across the ten year period; the lower one's social class the more likely it is that LLTI will be reported.

As mentioned above, the extended models (Model I 1991 and 2001) show no significant differences between the reference group and other migration groups or remainers in SARP areas. Here I control for further characteristics (individual and household) that may affect likelihood of experiencing LLTI (economic status, educational qualifications, ethnicity, housing tenure, person's resident in the dwelling, car ownership and household type). Model G 1991 demonstrated that those most likely to experience LLTI were older, single males who had never works. However, this alters slightly when the additional variables are added in Model I 1991 as in terms of marital status, widowed individuals become more likely to be ill as opposed to single people. The additional variables in Model I show that economically inactive groups such as those who are retired and 'other inactive' are most likely to experience LLTI compared with those in full-time employment which corresponds to Model H's finding that those who had never worked were most likely to experience LLTI compared with professional individuals. In addition, we find that those who are non-white are almost twice as likely to experience LLTI (OR= 1.90 $p< 0.05$), a result which contradicts the bivariate reporting above and is to be expected given that previous studies such as that by Nazroo (1997) found that adults in certain ethnic minority groups in Britain are more heavily afflicted by LLI than whites, particularly Pakistanis and Bangladeshis. However, this result is only found for this model as by 2001 the result is not significant. In addition the cross sectional modelling above did not observe any effect indicating that ethnic minority residents were in worse health than white residents. However, the employment modelling in the previous chapter found that ethnic minorities were more likely than white residents to be unemployed, thus it is unclear why the LLTI modelling has not uncovered more evidence that ethnic minorities have a greater likelihood of illness. This may again be down to the self-report element of LLTI. It will be interesting therefore to follow this up in the next section which looks at the clinical outcome, hospital admissions as for example, Blackman (2006) notes that South Asians have been found to be 40% more likely than the rest of the population to contract coronary heart disease.

The baseline model I also demonstrates that in terms of housing tenure, social renters and private renters are more likely than home owners to report LLTI. However the effect is most pronounced for social renters who are just over one and a half times more likely than homeowners to report LLTI (OR=1.52 $p <0.001$), whilst private renters are 1.47 times more likely to be ill than homeowners. This result fits with previous findings in literature on migration and health. For example, Boyle et al.

(2002) found that migrants in public housing are more likely to be ill than non-migrants as newcomers to an area are often given priority for housing if they have a disability or long-term illness. Model I at baseline also demonstrates that having no car is a predictor for experiencing LLTI, which is consistent with the cross sectional models above, whilst lastly the results also demonstrated that couples with no dependent children were more likely to be ill, a result also consistent with the cross sectional findings. Thus, to sum up in 1991 the person most likely to report LLTI in 1991 is an older non-white male who is either widowed or in a couple with no dependent children, has no car and is economically inactive (never worked or retired).

These findings are largely mirrored by 2001 with the exception that in the marital status category, those who are married become the most likely to report LLTI compared with single residents (OR= 1.31 $p< 0.001$). This result mirrors the cross sectional findings and is contrary to what one would expect, i.e. that married individuals would be less likely to experience illness compared to single people. Beyond this finding all effect sizes and patterns from 1991 and 2001 largely replicate what was found in the repeated cross sectional modelling above.

It should however be noted here that the sensitivity analysis for Model I 1991 (see Appendix 7) showed one difference on the economic status variable when the permanently sick category was dropped in that the likelihood of students to suffer from LLTI became non-significant. In addition the sensitivity model for Model I 1991 showed that those who never worked became were not significantly more likely than professionals in the social class category to report LLTI whilst the above reported effect for those in private renting also became non-significant. Furthermore, the effect for those living alone also became non-significant. In addition Model I 2001 (also Appendix 7) showed differences on two variables. For example, the results for categories 4, 5, 6 and 7 of the social class variable (skilled manual, partly-skilled, unskilled and never worked) became non-significant whilst the results for lone parents became non-significant. This demonstrates that when the permanently sick category was dropped from the economic status variable some of the categories above which were significant mainly at $p<0.05$ level became non-significant. However, the sensitivity modelling did not display any differences in regards to the main results between treatment and comparator residents when the permanently sick category was removed.

Returning to the hospital admissions modelling, in regards to Model L, at baseline the results show that older divorced residents, who are partly skilled or are permanently sick, live in social rented accommodation with others are most likely to be admitted to hospital. By the 2001-2004 period however, it is older married individuals who are permanently sick and rent social housing. These results are on the whole broadly similar to what we have observed for the cross sectional modelling

for hospital admissions and also for the LLTI modelling in general. The sensitivity analysis for Model L 1991 (see Appendix 8) showed one difference in that the unemployed category of the economic status variable became non-significant but again this did not affect the overall result of the model in regards to likelihood of hospital admissions for regeneration residents against comparators.

In conclusion the results indicate that the selective migration analysis for LLTI supports hypothesis 2 as those who moved out of or into regeneration (and comparator) areas had no significant difference to 'untreated' remainers in comparator areas on likelihood of experiencing LLTI. This therefore indicates that a moving escalator effect has not occurred within regeneration or comparator areas. However, this cannot be conclusively stated as those who moved out to areas in the rest of Scotland were excluded from the analysis because residents in these areas were not in a regeneration or comparator area at this point in time and could well have moved away before the regeneration started. Thus any results for these groups at 2001 could not be confidently linked to regeneration effects. I can therefore conclude that for LLTI, no evidence of moving escalator effects is observed in SARP areas compared to comparator areas and, ultimately, that no evidence regarding the efficacy of the SARP programme to improve the LLTI outcomes of these residents relative to comparator residents who did not receive the programme has been found.

In terms of hospital admissions, the main finding from the selective migration modelling is that an unhealthy mover effect was observed at the baseline period for those moving out of disadvantaged areas (both comparator areas and the areas that were later to be designated SARP areas). As the SARP programmes did not initiate until 1996 I cannot of course attribute this finding to any regeneration effect and therefore hypothesis 2 can neither be confirmed nor refuted.

In relation to the second research question for the quantitative phase of the thesis, the results suggest that the likelihood of suffering morbidity did differ for varying migrant groups, in that those who moved out before the programme started were more likely to be hospitalised. Thus, the findings do not support the assertion that those who move out of regeneration areas have done so because they have benefitted from the programme in a way that is statistically different from those who did not receive the programme. Whilst in addition, the characteristics of residents most likely to be hospitalised do not change in any significant way over the study period and are broadly similar to those found in the previous cross sectional hospital admissions modelling and also the LLTI modelling.

In addition the results for those residents included in the analysis who remained in SARP areas over the ten year period are similar to the results found for the same category in the previous chapter

that investigated the impact of the programmes on unemployment. Thus, once all independent variables were added to the modelling for both outcomes, there was no evidence to suggest that the likelihood of reporting LLTI or being admitted to hospital reduced over the ten year period for this group compared with those who remained in the comparator areas. This again does not reflect well on the SARP programmes and the result for the category 5 residents who remained in the regeneration areas particularly exemplifies this as of course they were exposed to programme initiatives for a greater duration of time than the other migration category residents. Reducing LLTI prevalence was a key aim of the programme and the results thus far demonstrate that this aim was not achieved despite significant investment in initiatives that were expected to impact positively on the health and well-being of residents such as health promotion. The reasons for this most obviously point to lack of community engagement with the programmes, which as we have seen in previous chapters is commonly stated to be the most important component of successful area regeneration (e.g. Mathers et al. 2008). With this in mind, the following section again focuses on the group of residents who remain in SARP areas across the study period by undertaking a Difference in Difference analysis to further attempt to look for evidence of regeneration effects by investigating whether the programme had any effects on the likelihood of morbidity in the SARP group *net* of the general change reflected in the comparator group over the study period.

The next section will use the difference in difference (DiD) approach to investigate the impact of the SARP programme on the likelihood of LLTI from a further longitudinal angle which attempts to account for national trends in morbidity.

Table 5-5 Logistic regression models predicting the odds of experiencing LLTI for varying migrant groups and remainers in SARP areas relative to remainers in comparator areas 1991-2001

Selective migration: Limiting Long Term Illness		1991						2001					
Variable	**Category**	**Model G (n= 29197)**		**Model H (n=29197)**		**Model I (n= 29197)**		**Model G (n=35965)**		**Model H (n=35802)**		**Model I (n=34884)**	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Population Groups	1. Stayed in comparator area	1		1		1		1		1		1	
	2. Comparator Area (1991) to Regeneration Area (2001)	0.64 **	0.46, 0.87	1.18	0.84, 1.66	1.09	0.68, 1.74	0.55 ***	0.43, 0.69	1.16	0.89,1.51	1.15	0.82, 1.62
	3. Comparator Area (1991) to Rest of Scotland (2001)	0.54 ***	0.47, 0.61	0.98	0.86, 1.13	1.34	0.95, 1.35						
	4. Regeneration Area (1991) to Comparator Area (2001)	0.56 **	0.39, 0.81	1.04	0.70, 1.56	1.08	0.64, 1.81	0.56 ***	0.43, 0.73	1.24	0.93, 1.66	1.02	0.69, 1.51
	5. Stayed in Regeneration Area (1991-2001)	0.85 ***	0.77, 0.92	0.95	0.86, 1.04	0.95	0.84, 1.07	0.87 ***	0.81, 0.93	0.99	0.92, 1.07	1.04	0.92, 1.14
	6. Regeneration Area (1991) to Rest of Scotland (2001)	0.45 ***	0.40, 0.50	0.88	0.77, 1.00	0.94	0.80, 1.12						
	7. Rest of Scotland (1991) to Comparator Area (2001)							0.45 ***	0.42, 0.49	1.13 *	1.03, 1.24	1.04	0.92, 1.17
	8. Rest of Scotland (1991) to Regeneration Area (2001)							0.40 ***	0.37, 0.43	1.07	0.98, 1.17	1.04	0.94, 1.16
Age	Age			1.05 ***	1.05, 1.06	1.03 ***	1.03, 1.04			1.06 ***	1.06, 1.06	1.03 ***	1.03, 1.04
Age Squared	Age Squared			0.99 ***	0.99, 0.99	0.99 **	0.99, 0.99			0.99 ***	0.99, 0.99	0.99	0.99, 1.00
Sex	Male (reference)			1		1				1		1	
	Female			0.66 ***	0.61, 0.72	0.70 ***	0.61, 0.79			0.91 **	0.86, 0.97	0.84 ***	0.78, 0.91

Marital Status	Single (reference)	1		1		1		1	
	Married	0.69 ***	0.62, 0.78	1.01	0.77, 1.30	0.71 ***	0.66, 0.78	1.31 ***	1.13, 1.52
	Widowed	1.07	0.90, 1.27	1.26 **	0.99, 1.60	1.17 **	1.04, 1.31	1.27 **	1.09, 1.47
	Divorced	0.71 ***	0.59, 0.85	0.94	0.74, 1.19	0.86 *	0.76, 0.98	1.28 **	1.09, 1.49
Social Class	Professional (reference)	1		1		1		1	
	Managerial	2.19 **	1.21, 3.99	1.54	0.75, 3.18	1.54 **	1.17, 2.03	1.29	0.93, 1.79
	Skilled and non-manual	2.91 ***	1.60, 5.27	1.65	0.79, 3.43	2.05 ***	1.56, 2.70	1.25	0.89, 1.75
	Skilled-manual	2.60 ***	1.44, 4.69	1.18	0.56, 2.45	2.88 ***	2.19, 3.78	1.44 *	1.03, 2.02
	Partly-skilled	3.95 ***	2.19, 7.12	1.55	0.75, 3.23	3.10 ***	2.36, 4.07	1.40 *	1.00, 1.97
	Unskilled	4.33 ***	2.38, 7.86	1.42	0.67, 3.00	3.76 ***	2.84, 4.97	1.49 *	1.05, 2.11
	Never worked	10.71 ***	5.96, 19.24	2.16 *	1.04, 4.47	5.66 ***	4.30, 7.44	1.66 **	1.17, 2.34
Economic Status	In full-time employment (reference)			1				1	
	In part-time employment			1.51 ***	1.21, 1.93			1.54 ***	1.30, 1.82
	Self-employed			1.17	0.78 1.76			1.83 ***	1.45, 2.32
	Unemployed			1.79 ***	1.45, 2.22			2.45 ***	2.03, 2.96
	Student			1.98 *	1.14, 3.43			2.21 ***	1.73, 2.83

	Permanently sick	15197.47 ***	3770.717 61251.8	247.37 ***	199.23, 307.06
	Retired	3.50 ***	2.80, 4.39	5.30 ***	4.54, 6.17
	Other inactive	2.88 ***	3.32, 3.58	5.34	4.70, 6.08
Qualifications	No qualification and NCR persons under 18 (reference)	1		1	
	Sub-degree	0.76	0.53, 1.08	1.08	0.88, 1.33
	Degree and higher	0.74	0.44, 1.23	1.01	0.86, 1.18
	Not stated	1.15	0.90, 1.46	0.94	0.80, 1.11
	Over 75 with qualification	0.95	0.70, 1.30	0.99	0.82, 1.21
Ethnicity	White (reference)	1		1	
	Non-white	1.90 *	1.05, 3.42	0.92	0.68, 1.23
House Tenure	Owner occupied (reference)	1		1	
	Social renting	1.52 ***	1.34, 1.72	1.54 ***	1.42, 1.67
	Private renting	1.19 *	0.87, 1.64	1.47 ***	1.28, 1.69
Central Heating	Central heating (reference)	1		1	
	No central heating	0.92	0.82, 1.04	1.08	0.94, 1.23
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.78 *	0.63, 0.95	0.97	0.85, 1.11

Car ownership	0 cars (reference)			1				1	
	1 cars			0.87 *	0.77, 0.98			0.84 ***	0.77, 0.91
	2 cars			0.89	0.71, 1.11			0.70 ***	0.61, 0.80
	3 cars			0.69	0.41, 1.71			0.78	0.61, 1.01
Household Type	Married and unmarried couples with no dependent children (reference)			1				1	
	Unmarried adult			0.91	0.69, 1.19			1.13	0.96, 1.34
	One parent families with dependent children			0.50 ***	0.35, 0.72			0.78 *	0.63, 0.95
	Married and unmarried couples with dependent children			0.61 ***	0.51, 0.75			0.81 **	0.71, 0.92
	Log Likelihood	-10217.913	-8670.6987		-5649.0862	-19282.262	-15410.534		-11194.069
							* p<0.05, **p<0.01, ***p<0.001		

Table 5-6 Logistic regression models predicting the odds of being admitted to hospital for varying migrant groups and remainers in SARP areas relative to remainers in comparator areas 1991-2004

Selective migration: Hospital admissions		1991-1994						2001-2004					
Variable	**Category**	**Model J (n= 29126)**		**Model K (n=29126)**		**Model L (n= 29126)**		**Model J (n=37364)**		**Model K (n=37078)**		**Model L (n=35754)**	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Population Groups	1. Stayed in comparator area	1		1		1		1		1		1	
	2. Comparator Area (1991) to Regeneration Area (2001)	0.90	0.71, 1.13	1.01	0.81, 1.27	1.00	0.79, 1.26	0.78 *	0.63, 0.96	1.15	0.93, 1.44	1.13	0.90, 1.42
	3. Comparator Area (1991) to Rest of Scotland (2001)	1.00	0.92, 1.10	1.12 *	1.02, 1.23	1.12 *	1.02, 1.23						
	4. Regeneration Area (1991) to Control Area (2001)	1.16	0.92, 1.48	1.30 *	1.02, 1.65	1.27	0.99, 1.61	0.53 ***	0.41, 0.69	0.82	0.63, 1.07	0.76	0.58, 1.00
	5. Stayed in Regeneration Area (1991-2001)	0.98	0.91, 1.05	1.00	0.93, 1.07	1.00	0.93, 1.08	0.90 **	0.85, 0.96	0.96	0.90, 1.03	0.97	0.90, 1.04
	6. Regeneration Area (1991) to Rest of Scotland (2001)	1.00	0.92, 1.08	1.11 ***	1.04, 1.23	1.14 **	1.04, 1.24						
	7. Rest of Scotland (1991) to Control Area (2001)							0.71 ***	0.66, 0.77	1.31 **	1.04, 1.22	1.07	0.98, 1.16

	8. Rest of Scotland (1991) to Regeneration Area (2001)					0.67 ***	0.63, 0.72	1.10 *	1.02, 1.18	1.06	0.98, 1.15
Age	Age	1.00 ***	1.00, 1.00	0.99	0.99, 1.00			1.02 ***	1.01, 1.02	1.00 ***	1.00, 1.00
Age Squared	Age Squared	1.00 ***	1.00, 1.00	1.00 ***	1.00, 1.00			1.00 ***	1.00, 1.00	1.00	1.00, 1.00
Sex	Male (reference)	1		1				1		1	
	Female	1.02	0.96, 1.08	0.95	0.89, 1.01			1.05 *	1.00, 1.11	1	0.95, 1.05
Marital Status	Single (reference)	1		1				1		1	
	Married	1.39 ***	1.28, 1.51	1.26 ***	1.10, 1.43			1.25 ***	1.16, 1.35	1.36 ***	1.23, 1.51
	Widowed	1.63 ***	1.43, 1.86	1.38 ***	1.21, 1.59			1.38 ***	1.24, 1.53	1.31 ***	1.18, 1.47
	Divorced	1.48 ***	1.26, 1.73	1.39 ***	1.17, 1.65			1.29 ***	1.14, 1.45	1.33 **	1.17, 1.51
Social Class	Professional (reference)	1		1				1		1	
	Managerial	1.55 **	1.15, 2.09	1.48 *	1.09, 2.02			1.24 *	1.01, 1.53	1.10	0.89, 1.36
	Skilled and non-manual	1.48 **	1.10, 1.99	1.32	0.96, 1.82			1.43 **	1.16, 1.76	1.09	0.87, 1.35
	Skilled-manual	1.54 **	1.15, 2.07	1.38 *	1.00, 1.90			1.60 ***	1.30, 1.96	1.17	0.85, 1.36
	Partly-skilled	1.78 ***	1.33, 2.39	1.51 *	1.09, 2.08			1.59 ***	1.29, 1.95	1.10	0.88, 1.37
	Unskilled	1.71 ***	1.26, 2.31	1.44 *	1.03, 2.00			1.62 ***	1.31, 2.01	1.08	1.05, 2.11

	Never worked	1.72 ***	1.28, 2.31	1.33	0.96, 1.85		1.68 ***	1.36, 2.06	1.16	0.92, 1.46
Economic Status	In full-time employment (reference)			1					1	
	In part-time employment			1.20 **	1.08, 1.34				1.18 **	1.07, 1.31
	Self-employed			0.95	0.79 1.15				0.81 *	0.68, 0.97
	Unemployed			1.14 *	1.01, 1.29				1.13	0.99, 1.30
	Student			1.02	0.78, 1.32				0.87	0.73, 1.02
	Permanently sick			2.29 ***	2.01, 2.60				2.71 ***	2.45, 2.99
	Retired			1.19*	1.02, 1.39				1.45 ***	1.28, 1.64
	Other inactive			1.36 ***	1.21, 1.54				1.45 ***	1.31, 1.59
Qualifications	No qualification and NCR persons under 18 (reference)			1					1	
	Sub-degree			0.95	0.81, 1.12				0.98	0.86, 1.11
	Degree and higher			0.92	0.75, 1.14				1.01	0.86, 1.18
	Not stated			1.19 *	1.03, 1.38				0.82 ***	0.73, 0.91
	Over 75 with qualification			0.77	0.60, 1.00				1.00	0.88, 1.14
Ethnicity	White (reference)			1					1	

	Non-white	0.76	0.53, 1.09	0.87	0.71, 1.07
House Tenure	Owner occupied (reference)	1		1	
	Social renting	1.11 **	1.04, 1.19	1.17 ***	1.10, 1.24
	Private renting	1.12	0.96, 1.31	1.07	0.97, 1.19
Central Heating	Central heating (reference)	1		1	
	No central heating	0.95	0.89, 1.01	0.88 *	0.84, 1.02
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.77 ***	0.68, 0.87	0.92	0.85, 1.11
Car ownership	0 cars (reference)	1		1	
	1 cars	1.02	0.95, 1.09	0.98	0.92, 1.04
	2 cars	1.1	0.99, 1.22	0.95	0.87, 1.04
	3 cars	1.09	0.89, 1.35	1.07	0.91, 1.26
Household type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	1.31 **	1.11, 1.54	0.94	0.84, 1.05
	One parent families with dependent	0.73	0.53, 1.02	1.20 **	1.05, 1.38

	children									
	Married and unmarried couples with dependent children			1	0.91, 1.10				1.03	0.95, 1.03
	Log Likelihood	-16313.453	-16194.062		-16028.787	-22457.787	-20995.308		-19870.878	

* p<0.05, **p<0.01, ***p<0.001

Section 5.6 Difference in Difference (DiD) analysis: net impacts of the SARP programme on likelihood of experiencing morbidity

At this point in the analysis we have seen no evidence to suggest that exposure to the SARP programme had any effect (be it positive or negative) on the likelihood of residents reporting LLTI relative to comparator area residents. In addition, and much the same as the results from the previous chapter, no evidence has been observed to suggest that the likelihood of experiencing LLTI (increased or decreased) between different migrant groups and those who remain in regeneration areas relative to residents who remain in comparator areas from 1991 to 2001.

Therefore, with this final empirical section of this chapter I employ the difference in difference (DiD) approach to investigate the impact of the SARP programme on the likelihood of experiencing morbidity from a further longitudinal angle which attempts to account for national trends in morbidity prevalence.

The full description of the DiD approach is provided in Chapter 3. However, to provide a brief recap with relevance for this chapter, the aim of the DiD method is to measure the average impact of a policy programme on a specific outcome. The approach differs from the previous cross sectional and longitudinal selective migration analyses by comparing the difference in the likelihood of morbidity among residents in SARP areas before and after the programme with that for comparator area residents. It therefore takes account of the changes occurring both in the treated group and comparator group, in effect the national trend, to identify whether the programme has had any *net* effects on the treated group minus the general change reflected in the comparator group. In this case, it is expected that between 1991 and 2001, even without the SARP programme, the level of LLTI would change in the treated and comparator areas reflecting the Scotland-wide change, which as was noted earlier, appeared to increase from 1991 to 2001. Explanations for this may well be due to a change in wording of the question in 2001 (Boyle 2004) or other aspects such as the consequences of selective migration, (which this analysis seems to show is not significant) or hidden unemployment (Marshall 2011).

The rationale for employing the DiD method in addition to the analytical techniques used above is that it appears to offer key additional advantages over these techniques in controlling for unobserved confounders. For example, it can remove any possible unobserved external differences in the SARP and comparator groups that may lead to better outcomes. These might be, for example, some of the factors listed above such as migration, hidden unemployment or indeed wider factors that may impact on morbidity such as, economic growth, or decline.

Here I will return to the first of the two research questions investigated in this chapter, which is set up to investigate whether living in SARP areas have had a positive or negative impact on the likelihood of suffering morbidity compared with living in similarly deprived comparator areas that did not receive the programme. However, despite the above mentioned advantages of the DiD method, neither of the analyses in the previous two empirical sections demonstrated any impact of the SARP programme in a positive or negative regard. I therefore hypothesise (hypothesis 3) that the results here will also be unable to demonstrate that the SARP programme has had a net positive or negative impact on likelihood of experiencing morbidity for residents in the treatment group.

To investigate hypothesis 3, the difference in difference technique is applied using two sets of fixed-effect regression models where LLTI is the dependent variable firstly, followed by hospital admissions in the second set (see chapter 3 for full description of DID technique). The analysis investigates whether SARP had any effects on the likelihood of experiencing morbidity in the SARP group net of the general change reflected in the comparator group over the ten year period between 1991 and 2001. As with the previous analyses, progressively more explanatory variables are added to help identify those factors that affect the likelihood of LLTI:

- Model M: Examines the net effect of the SARP programme with no control for individual or household characteristics.
- Model N: Estimates the net effect of the SARP programme on LLTI by controlling for individual explanatory variables that I expect to impact on the likelihood of an individual experiencing LLTI. These variables are marital status and social class.
- Model O adds additional explanatory variables that may act as confounders in the relationship between the SARP programme and the likelihood of individuals experiencing LLTI. These are educational qualifications, housing tenure, car ownership and household type.
- This sequence is repeated for hospital admissions (Models P, Q and R):

Table 5-7 below presents the results of the DiD analysis for LLTI whilst Table 5-8 presents the results for hospital admissions. Model M shows that after the implementation of the SARP, residents living in SARP areas were significantly more likely to experience LLTI than residents living in the comparator areas (OR= 8.23 $p<0.001$). However, the additional models demonstrate that after we account for individual and household characteristics, hypothesis 3 is upheld**.** The result for Model M again therefore underlines the importance of controlling for individual characteristics. The results here therefore reinforce the findings from the repeated cross section and selective migration analyses as even when the national trend is accounted for over the ten year period the SARP

programme is again shown to have had no effect (positive or negative) impact on likelihood of experiencing LLTI for SARP area residents relative to comparators.

In regards to the analysis for hospital admissions, Model P shows that after the implementation of the SARP, residents living in SARP areas were significantly more likely to be admitted to hospital than residents living in the comparator areas (OR= 1.50 p<0.001). However, the additional models demonstrate that after we account for individual and household characteristics, hypothesis 6 is confirmed. The results here therefore reinforce the findings from the repeated cross section and selective migration analyses as even when the national trend is accounted for over the ten year period the SARP programme is again shown to have had no positive or negative impact on likelihood of being admitted to hospital for SARP area residents relative to comparators

The results from Model N for LLTI demonstrate similar findings to those observed in the earlier analysis in regards to economic status, and demonstrate that in this model, economic status is a key driver in regards to likelihood of experiencing LLTI. Thus, beyond the somewhat obvious finding that the permanently sick are the most likely of the economic status categories to report LLTI compared to those in full-time employment (OR=1128 p< 0.001), we observe that the retired are the next most likely group to experience LLTI (OR=6.44 p< 0.001). As mentioned earlier in this chapter, advancing age will play a major contributory factor in this result. We then observe the more surprising result that students are approaching five times more likely than full-time workers to report LLTI (OR= 4.71 p< 0.001). Students on the whole tend to be younger individuals, thus one would have expected this group to be less likely or not significantly different to the full-time group in regards to likelihood of experiencing LLTI. However this result attenuates and becomes non-significant with the addition of variables pertaining to educational qualifications, housing tenure, household type, overcrowding in the household and car ownership. Economically inactive individuals are reported as just over four times more likely than full-time workers to experience LLTI (OR= 4.22 p< 0.001) whilst the unemployed are just under four times as likely (OR= 3.77 p< 0.001, results that are expected following the results from the modelling above.

One of the key findings from Model O (beyond the fact that there are once again no net positive or negative impacts on the likelihood of experiencing LLTI for SARP residents relative to comparators) is that the strength of the impact of economic status as a driver of LLTI remains and intensifies for some categories. These are permanently sick (OR=1151.33 p<0.001) retired (OR=6.56 p< 0.001) and other inactive (OR=4.36 p< 0.001) categories. In addition, we find that in terms of household type the difference in difference results also accord with results from the cross sectional and selective

migration modelling in that lone parents (OR=0.40 p< 0.05) and couples with children (OR=0.57 p< 0.05) are found to be less likely to report LLTI than couples with children.

Model O therefore demonstrates that the characteristics most likely to increase the odds of experiencing LLTI are being retired and living as part of a couple with no children, a result which is heavily influenced by ageing. In summary, the DiD estimation confirms hypothesis 3 by showing that the SARP programme had no net positive or negative impact on the likelihood of experiencing LLTI for regeneration area residents relative to residents in comparator areas net of all other variables.

Finally, based on the Models Q and R, several conclusions can be drawn in regards to what affects the likelihood of being admitted to hospital in disadvantaged areas. For example, residents who are divorced are more likely than single residents to be hospitalised (Model Q: OR=2.00 p<0.001; Model R: OR=1.80 p<0.01) whilst those who are retired are more likely to be hospitalised than those in full time employment (Model Q: OR=1.67 p<0.001; Model R: OR=1.82 p<0.001). The extended model (Model R) also demonstrates that those who did not state their qualifications were almost two and a half times (OR=2.76 p<0.001) more likely than those with no qualifications to be hospitalised.

In addition to the above, the sensitivity analyses for LLTI (Appendix 7) showed one difference in that the result for one parent families became non-significant when the permanently sick category was dropped from the economic status category. Furthermore, the sensitivity analysis for Hospital admissions A (Model R Appendix 8) also showed one difference on the lone parent category. However in this case the sensitivity model showed that one parents were significantly more likely to be admitted to hospital. Despite these differences on independent variables the sensitivity analyses did not show any differences in terms of net impact, thus demonstrating the robustness of the results reported here.

The DiD analysis is the most sophisticated of the three quantitative analytical techniques employed in this thesis. The results here therefore provide the most rigorous assessment of the impact of the programmes on morbidity for those who lived in SARP areas for the duration of the study period. At the end of the previous section I focused on (as a prelude to this section) the implications of finding no positive regeneration effect on likelihood of suffering morbidity for those who remained in SARP areas throughout the study period. I stated that this group were extremely important as they had the greatest exposure to the programmes. Thus finding that there had been no improvement in morbidity outcomes for this group indicated the programmes had been unsuccessful. I have with this analysis therefore went one step further in analytical sophistication to further attempt to uncover regeneration effects on this group by assessing the unique impact of the programmes by

using a technique that eliminates the influence of any unobserved and fixed (over time) effects on likelihood of morbidity. The results have again shown that the SARP programmes did not improve morbidity outcomes for those who remained in the regeneration areas throughout the study period and therefore lend further strength to the supposition that the SARP programmes have been unable to improve morbidity outcomes for residents. The DiD estimation therefore confirms hypothesis 3 by showing that the SARP programme had no net positive or negative impact on the likelihood of being admitted to hospital for SARP area residents relative to residents in comparator areas net of all other variables. The concluding section will reflect further on these findings.

Table 5-7 Fixed effects regression models predicting the net impact of suffering from LLTI in SARP areas by 2001 relative to comparator areas

LLTI Difference in Difference

Variable	Category	Model M (n= 7850)		Model N (n= 7810)		Model O (n=7622)	
		OR	95% CI	OR	95% CI	OR	95%CI
	Net impact of suffering from LLTI in SARP areas by 2001 relative to comparator areas	8.23 ***	7.25, 9.35	1.27	0.86,1.46	1.14	0.87, 1.49
	*Dummy variable			7.22 **	5.80, 9.00	6.83 ***	5.31, 8.80
	*Treatment variable			0.77	0.36,1.65	0.54	0.28,1.31
Marital Status	Single (reference)			1		1	
	Married			1.4	0.60, 3.28	1.81	0.71, 4.61
	Widowed			1.39	0.51, 3.78	2	0.71, 5.68
	Divorced			1.68	0.65, 4.30	2.44	0.89, 6.70
Economic Status	In full-time employment (reference)			1		1	
	In part-time employment			1.37	0.83, 2.25	1.43	0.87, 2.34
	Self-employed			2.02	0.82, 4.99	1.66	0.66, 4.20
	Unemployed			3.77 ***	2.31, 6.15	3.48 ***	2.11, 5.73
	Student			4.71 ***	2.79, 4.95	2.51	0.99, 6.39
	Permanently sick			1128.35 ***	426.78,2983.16	1151.33 ***	431.12, 3074.66
	Retired			6.44 ***	4.05, 10.25	6.56 ***	4.07, 10.56
	Other inactive			4.22	2.78, 6.40	4.36	2.83, 6.72

		***	***	
Social Class	Professional (reference)		0.31	0.16,1.61
	Managerial		0.49	0.12,2.59
	Skilled and non-manual		0.35	0.10,2.61
	Skilled-manual		0.51	0.12,2.64
	Partly-skilled		0.28	0.08, 1.64
	Unskilled		0.37	0.11, 1.72
	Never worked		0.38	0.06, 2.09
Qualifications	No qualification and NCR Persons under 18 (reference)		1	
	Sub-degree		0.58	0.29, 1.18
	Degree and higher degree		1.31	0.53, 2.40
	Over 75 with a qualification		0.91	0.57, 1.44
	Not stated		1.35	0.94, 1.93
House Tenure	Owner occupied (reference)		1	
	Social renting		1.2	0.87, 1.67

	Private renting			1.29	0.72, 2.30
Household type	Married and unmarried couples with no dependent children (reference)			1	
	Unmarried adult			0.76	0.42, 1.37
	One parent families with dependent children			0.40 *	0.19, 0.82
	Married and unmarried couples with dependent children			0.57 *	0.37, 0.88
Car ownership	0 cars (reference)			1	
	1 cars			0.64	0.47, 0.87
	2 cars			0.72	0.43, 1.19
	3 cars			0.55	0.23, 1.27
	Log Likelihood	-419.58805	-845.72063		-807.09691

Dummy variable represents the likelihood of suffering LLTI over time (2001 vs 1991)

* p<0.05, **p<0.01, ***p<0.001

Treatment variable is a dummy variable for living in the SARP areas or in comparator areas through time

Table 5-8 Fixed effect regression models predicting the net impact of being admitted to hospital in SARP areas by 2001 relative to comparator areas

Hospital admissions Difference in Difference

Variable	Category	Model P (n= 13898)		Model Q (n= 13758)		Model R (n=13378)	
		OR	**95% CI**	**OR**	**95% CI**	**OR**	**95%CI**
	Net impact of likelihood of hospitalisation in SARP areas by 2001 relative to comparator areas	1.50 ***	1.41, 1.60	0.93	0.84,1.03	0.95	0.85, 1.06
	*Dummy variable			1.42 ***	1.30, 1.55	1.28 ***	1.15, 1.41
	*Treatment variable			1.42 **	1.10,1.82	1.39 **	1.08,1.79
Marital Status	Single (reference)			1		1	
	Married			1.04	0.81, 1.33	1.25	0.94, 1.66
	Widowed			0.91	0.65, 1.26	1.11	0.78, 1.58
	Divorced			2.00 ***	1.44, 2.77	1.80 **	1.26, 2.57
Economic Status	In full-time employment (reference)			1		1	
	In part-time employment			1.08	0.92, 1.26	1.13	0.96, 1.33
	Self-employed			0.82	0.60, 1.12	0.87	0.63, 1.19
	Unemployed			0.91	0.76, 1.09	0.93	0.7 7, 1.11
	Student			1.06	0.87, 1.28	1.20	0.86, 1.77
	Permanently sick			1.23 *	1.04, 1.45	1.36 ***	1.14, 1.61
	Retired			1.67 ***	1.42, 1.96	1.82 ***	1.54, 2.15
	Other inactive			1.18	1.01, 1.37	1.37	1.17. 1.60

		*	***	
Social Class	Professional (reference)		1	
	Managerial		0.86	0.55,1.37
	Skilled and non-manual		0.83	0.52,1.32
	Skilled-manual		0.87	0.55,1.38
	Partly-skilled		0.87	0.54,1.38
	Unskilled		0.85	0.53,1.38
	Never worked		0.76	0.48,1.21
Qualifications	No qualification and NCR Persons under 18 (reference)		1	
	Sub-degree		0.94	0.74, 1.20
	Degree and higher degree		0.92	0.71, 1.19
	Over 75 with a qualification		1.20 *	1.00, 1.43
	Not stated		2.76 ***	2.24, 3.40
House Tenure	Owner occupied (reference)		1	
	Social renting		1.09	0.97, 1.23
	Private renting		0.96	0.77, 1.20

Minimal household unit	Married and unmarried couples with no dependent children (reference)			1	
	Unmarried adult			1.04	0.85, 1.28
	One parent families with dependent children			0.82	0.63, 1.07
	Married and unmarried couples with no dependent children			0.92	0.59, 1.43
Car ownership	0 cars (reference)			1	
	1 cars			0.9	0.81, 1.02
	2 cars			0.87	0.73, 1.03
	3 cars			0.81	0.61, 1.07
	Log Likelihood	-4727.1408	-4553.8169		-4368.2738

Dummy variable represents the likelihood of being admitted to hospital over time (2001 vs 1991)

* p<0.05, **p<0.01, ***p<0.001

Treatment variable is a dummy variable for living in the SARP areas or in comparator areas through time

Section 5.7 Conclusion

The objective of this chapter was to investigate, in the context of outcomes pertaining to morbidity, the two research questions that underpin the quantitative phase of this thesis:

(1) Does living in SARP areas have a positive or negative impact on the likelihood of suffering morbidity compared with similarly deprived residents living in comparator areas that did not receive the programme?

(2) Does the likelihood of suffering morbidity differ across migrant groups, who moved into, out of or remained in SARP treatment areas and comparator areas?

To investigate these questions I conducted the three distinct sets of quantitative analyses set out in Chapter 3 (Data and Methods). These were: repeated cross-sectional, longitudinal selective migration and Difference in Difference (DiD). Based on the results of the analyses, the overarching finding of the chapter in relation to the first research question is that the SARP programme appears to have had no impact (positive or negative) on an individual's likelihood of experiencing morbidity. A result which corresponds to that seen for the same research question in regards to the unemployment outcome presented in the previous chapter. Cotterill et al. (2008) suggest that in the absence of an observable regeneration impact there are two possible explanations. Firstly that the programme has simply had no effect and secondly the programme did have an effect but the outcome variables used were unable to detect any change. With these explanations in mind, I used outcome variables here that had 5 years post initiation of the programmes to note an effect (in the case of LLTI) and then another outcome variable that had 8 years post initiation of the programmes to note effects (hospital admissions). It is possible that these time lags were not long enough to observe changes however, 5 and 8 years is longer than many other studies have been able to employ (e.g. Huxley et al. 2004; Kearns et al. 2008; Stafford et al. 2008). In addition, if the programme simply has not worked then this may be due to lack of participation by residents, particularly those that are hardest to reach in disadvantaged areas. This has been investigated in qualitative studies (e.g. Gosling 2008; Mathers et al. 2008; Carlisle 2010) that have broadly emphasised the need for community engagement with the area regeneration initiative.

In regards to the second research question that was addressed by the selective migration analysis, the results suggest that regeneration area migrants (both in-movers and out-movers) and those who remained in SARP areas over the ten year period had no decreased or increased likelihood of experiencing morbidity when compared to residents living in comparator areas throughout the 10 years for likelihood of LLTI and 14 years for likelihood of hospital admissions.

The results of this analysis therefore do not accord with studies that find area regeneration merely facilitates moving escalator processes, or those that have found migration processes to improve deprivation in regeneration areas. The results of the selective migration analyses accord more with those from those from the previous chapter which investigated likelihood of unemployment as an outcome variable. Thus, the findings here do not support the assertion that those who move out of regeneration areas have done so because they have benefitted from the programme in a way that is statistically different from those who did not receive the programme. The analysis did however observe some interesting evidence that those who moved out of SARP areas to-be and comparator areas at baseline were more likely than the reference category to be admitted to hospital. Whilst this is a finding that cannot be attributed in any way to the SARP programme it is a surprising finding as previous literature has emphasised that the most healthy individuals will be more likely to migrate from disadvantaged areas (Boyle 2004). It was concluded that the reasons for this finding may be that people with poor health may have been more likely to lose their jobs in the early 1990s recession and therefore may have moved away to cheaper accommodation. Or, that these individuals had been re-housed within social housing to make allowances for disability. For example, they may have moved to housing with adaptations or a bungalow.

As stated in the conclusion to Chapter 4, Bailey and Livingstone (2008) suggest that selective migration effects may not be picked up in analyses if the extent of selective migration is affected by the stage of an intervention as well as the nature of the intervention, or if the declaration of a major regeneration programme for an area leads to a 'bounce' in demand where people who might have left defer moving to see how the initiative works. I argued in the conclusion to Chapter 4 that neither of these suggestions can explain the absence of regeneration-induced selective migration effects. Here in this analyses and I make the same point here for the following reason. The treatment areas had been subject to regeneration initiatives for 5 years by 2001 and 8 years in regards to the hospital admissions outcome, by which time one would imagine individuals who had benefitted from the programme and who were thinking of moving out would have done so. Thus in terms of the stage of the programme one would again presume that in regards to the SARP programmes which were due to run until 2006, that some significant regeneration activities had occurred by 2004 in particular. However, there is again the potential that the outcome variables used here were unable to pick up on any changes in health status amongst movers and remainers as the time lag was too short. Bailey and Livingstone (2008) also state that the nature of the intervention may be a reason for initiative-induced migration effects to be unnoticed. Indeed, it may be the case here that the initiative was

simply unable to improve the health of residents in the chosen areas, perhaps due to an inability to engage residents in the initiatives involved in the programme.

In addition to these main findings, a number of conclusions can be drawn about what factors affect the likelihood of experiencing morbidity for individuals in disadvantaged areas (both regeneration and comparator). A somewhat mixed pattern emerged in regards to each of the three analyses for the extended models that appeared to be heavily influenced by the impact of ageing.

Firstly, the extended models for both outcomes on the repeated cross section results demonstrated that on the whole the morbidity profiles remained steady across the two time points, particularly for LLTI where the most noticeable difference across the two surveys was that residents in all economic status categories (with the exception of the permanently sick) became more likely to report LLTI by 2001. However in the cross sectional hospital admissions results this increase in likelihood for economic status categories was only observed for the permanently sick, retired and other inactive categories. In regards to the selective migration analyses the morbidity profile of the study population for the LLTI modelling replicated the cross sectional results and remained constant over the ten years with the exception of marital status categories where widowers were most likely to experience LLTI ant baseline compared to single residents, however at 2001 this changed to married residents. In regards to hospital admissions, the morbidity profile of the selective migration sample replicated the cross sectional equivalent and like the LLTI modelling married people were again the most likely of the marital status categories to be hospitalised by the 2001 – 2004 period. Finally the DiD modelling demonstrated that the main indicator of morbidity for both outcomes was being retired.

The results presented in this chapter therefore suggest that living in a SARP area had (1) no positive (or negative) impact on the likelihood of suffering morbidity compared with similarly deprived residents living in comparator areas, and that (2) the likelihood of suffering morbidity did not differ across migrant groups, who moved into, out of or remained in SARP treatment areas and comparator areas. With this in mind a picture is beginning to emerge that suggests the SARP programme has not been successful in achieving some of the core aims of the project. I can say this as the results here for morbidity can be aligned to those found in the previous chapter on unemployment. More is known about the types of initiatives and the strategy that the SARP programme initiated to tackle unemployment, and thus it is somewhat simpler to make recommendations (based on the unemployment results) as to what regeneration programmes can do to alleviate high levels of unemployment in deprived areas (i.e. to attempt more in the way of increasing actual job numbers in disadvantage areas to compliment the almost exclusively supply

side measures that have been the primary focus in recent times). This is less so when it comes to health improvement where less is known about the initiatives that were in place to improve health and thus the evidence is more nebulous. However, of course, unemployment and ill health are strongly correlated (e.g. Minton et al. 2012), thus if a regeneration initiative were able to achieve increased levels of employment in an area for all those of working age who were able to work then it is likely that rates of morbidity would recede. Thus, for working age residents it is feasible to say that to some extent, strategies to tackle unemployment are in fact at the same time strategies that if successful, will in turn improve health. However, we know that regeneration initiatives have attempted to go further than this in regards to improving health inequalities, and that those initiatives such as SARP were conceived to improve the health of all residents in disadvantaged areas not just working age individuals.

Despite a currently limited amount of information regarding the minutiae of what specific health promoting initiatives SARP has rolled out (such as provision of cheap fruit and vegetables) we would nevertheless expect that other aspects of the holistic economic, environmental and social SARP effort would impact favourably on health outcomes for residents as in indicated in the thesis conceptual framework outlined in Chapter 2. For example, improving the built environment has routinely been theorised to improve health (Northridge and Schulz (2004), whilst efforts to improve social capital would also be expected to improve health (Helliwell 2001). Thus past literature suggests that even without a specific health component, the health of residents should improve through economic, environmental and social initiatives. However, the results here suggest that despite the SARP programme's holistic economic, social and environmental approach to regeneration (that also included specific health promoting initiatives) the programme has not appeared to improve the health of residents who experienced it relative to matched comparator residents who never experienced the programme.

Chapter 6 The Impact of the Scottish Area Regeneration Partnership Programmes on All-Cause Mortality

Section 6.1 Introduction

Geographical inequities in all-cause mortality have been well documented in the UK. Areas with the highest mortality rates have routinely been identified as those in urban areas that are associated with industrial decline (Asthana and Halliday 2006). Mortality inequities have also therefore been found to be more pronounced for men who have suffered disproportionately following the loss of blue collar jobs in particular (Scottish Government 2008). Illustrating this, Wood et al. (2006) showed that men living in areas in the least deprived quintile are expected to live 94% of their life in good health, compared with 85% in the most deprived quintile, whilst women in the least deprived fifth are expected to live 93% of their life in good health, compared with 84% in the most deprived fifth of the areas (Wood et al. 2006).

In Scotland, mortality rates are higher than the UK as a whole (Scottish Executive 2008) and over the last two decades Leyland et al. (2007) found that inequalities in mortality rates between the most and least deprived areas in Scotland have increased. For example, the Scottish Executive (2008) published figures that suggested mortality rates for those under 75 in the 10% most deprived areas are three times higher than those in 10% least deprived areas. Thus, the general population in deprived areas is more likely to die earlier than their counterparts in the least deprived areas.

The causes of these inequalities have been attributed partly to reduced mortality rates in the least deprived areas relative to those in the most deprived areas (Uren and Fitzpatrick 2001). However, selective migration has also been hypothesised to play a role in the widening of mortality inequalities whereby the composition of areas change over time as people migrate between different areas (Brown et al. 2010). For example, we have seen in the previous chapter on morbidity that Boyle stated that that migration has been an important determinant of population health in an area, in that healthy people tend to migrate away from the most disadvantaged areas whilst unhealthy people migrate to the most disadvantaged areas (Boyle et al. 2002; Norman et al. (2005).

The objective of this chapter is to investigate if the SARP programmes had a positive or negative impact on the risk of all-cause mortality for residents compared with those living in the comparator areas that did not receive the programme.

The chapter begins by providing an overview of links between area-based regeneration programmes and mortality before moving on to describe the empirical analyses that are undertaken to investigate the impact of the SARP programmes on mortality. Here I use repeated cross-sectional

analysis to ascertain change in mortality incidence rate ratios for residents living in comparator areas at the baseline period 1991-1994 and then the period 2001-2004.

Section 6.2 Area regeneration and mortality

The ability of area-based regeneration programmes to make a contribution to tackling and thus reducing higher than average mortality rates in disadvantaged areas is currently unclear. As an outcome variable, all-cause mortality has not been as widely used as measures of morbidity in studies evaluating the health and well-being implications of area regeneration practices. This may be due to the assumption that it takes longer to observe impacts on mortality rates following area regeneration initiatives than impacts on morbidity outcomes (Weinehall et al. 1999). Thus, as obtaining long-term data has proved difficult in many cases, several previous studies have relied on shorter time-lag data of generally less than 5 years (e.g. Kearns et al. 2008, Huxley et al. 2004, Thomson et al. 2007) which are theorised to be more amenable to assessing morbidity outcomes.

Thomson et al's (2006) systematic review investigating the impact of area-based initiatives on health outcomes found two previous evaluations where mortality outcomes were assessed (Scottish Executive Central Research Unit 1999 and Brennan et al. 1999). The study by Brennan et al. which evaluated the impact of the Single Regeneration Budget (SRB) programme in England reported overall improvements in mortality rates (standardised mortality rate 122 per 1000 in 1994 versus 118 per 1000 in 1998), whilst the study by the Scottish Executive Central Research Unit, which evaluated the New Life for Urban Scotland (NLUS) programme, found improvements in standardised mortality rates in some case study areas (131 per 1000 in 1998 versus 114 per 1000 in 1994) but on the other hand, actually noted increases in others. Similarly, Walsh et al. (2007) also evaluated the NLUS programme as part of a wider study investigating change in various health indicators over a 20 year period, 1981- 2001. Changes in life expectancy and coronary heart disease mortality were both used as measures of mortality, however the NLUS areas showed no signs of improvement in life expectancy, whilst one area showed a reduction in coronary heart disease mortality. However, another two NLUS areas showed a widening gap between these areas and the rest of Scotland in terms of coronary heart disease mortality, with those living in NLUS areas having higher rates.

Each of these three studies was limited in that no measure of the counterfactual was provided. However, a further study by Cotterill et al. (2008) that evaluated the impact of the New Deal for Communities (NDC) programme on morbidity and mortality was able to provide a measure of the counterfactual, and include all regeneration areas in the region of interest to the study (West Midlands in England). However the study was unable to demonstrate any difference in all-cause

mortality either before or after the implementation of the NDC initiative, nor between NDC areas and comparator areas.

The results from these studies therefore illustrate the mixed picture on mortality impacts associated with area regeneration programmes. In regards to the SARP programmes no study to date has been conducted to investigate how these programmes influenced mortality levels in disadvantaged areas. Mortality was not stated as a core indicator to be monitored in the official SARP evaluation effort (Tyler et al. 2001). Nevertheless, given that neighbourhood conditions have been found to have an independent effect on overall mortality (Kearns 2004), it is appropriate that to provide insight into the impact of the SARP programmes on mortality and contribute to the wider evidence base on the impacts of area regeneration programmes more generally on mortality.

Section 6.3 Repeated cross-sectional area change analysis: incidence risk of mortality over time

Using data from the Scottish Longitudinal Study (SLS), poisson regression models were fitted to investigate incidence rate ratios for all-age all-cause mortality among SARP residents relative to comparator residents at 1991-1994 firstly and then 2001-2004. In this case, I used poisson regression models in Stata 11.0 to generate the Incidence Rate Ratio (IRR) of mortality events in SARP area relative to comparator areas. The IRR is derived from calculating the incidence rate for the regeneration area residents divided by the incidence rate for the comparators and is interpreted in a similar fashion to the odds ratio generated by a logistic regression (Juul 2006).

As described in Chapter 3 (Data and Methods) the mortality events were drawn from vital events registry data that is available to users of the SLS and is currently linked from 1991 up to 2010. In a similar fashion to the analysis of hospital admissions outcomes, it was decided to analyse mortality events in the regeneration and comparator areas using two 3 year time periods in order to compare mortality incidence before and after the SARP programme was initiated. The first of these periods (1991-1994) was selected to provide an insight into all-age mortality incidence in these areas before the regeneration programme commenced in 1996. The second time period selected (2001-2004) provides insight into mortality incidence in regeneration and comparator areas when the regeneration partnership programme was at the half way stage (2001) and beyond up to 2004.

The analysis was carried out for the research population as a whole for the reason that the SARP programme was aimed at residents of all age groups. The modelling sequence carried out was as follows:

- Model A (1991): includes only the area type: regeneration areas versus comparator areas (reference category) at the 1991-1994 baseline period. This model therefore predicts the risk of death for regeneration area residents compared with comparator area residents without accounting for individual or household characteristics.
- Model B (1991): includes the area type: comparator areas (reference category) and regeneration areas, and basic individual explanatory variables that I expect will impact on the likelihood of an individual's risk of death. These variables are: age, age^2, sex, marital status and social class at baseline.
- Model C (1991): includes the area type: comparator areas (reference category) regeneration areas, and extended individual and household explanatory variables in addition to those used in Model B. This model is designed to therefore add further characteristics to the modelling that may impact on the risk of death. These are: educational qualifications, ethnicity, housing tenure, persons living in the dwelling, car ownership and household type at baseline.
- This modelling sequence was then repeated for 2001, 5 years after the regeneration programme had started.

As with the previous two chapters a brief discussion of the unadjusted bivariate links between the independent variables and the outcome variable prior to their inclusion the multivariate analysis is given here. Firstly, Table 6-1 below demonstrates the unsurprising results that that older residents at 1991 and 2001 have a greater risk of death than younger residents whilst female residents at 2001 have a lesser risk of death than men. At 1991 and 2001 married, divorced and widowed residents are found to have a greater risk of death compared to single residents which may well be because a high proportion of single residents in the sample will be younger residents. In addition, a further unsurprising finding is that those with qualifications in the all-age sample have lesser risk of death at 1991 and 2001 than those who do not. At both time points those who are non-white have a lesser risk of death than white residents, which is a surprising finding given that those from ethnic minorities are routinely found to have worse health outcomes than white residents (e.g. Klodawski 2013). Furthermore, those who own cars (with the exception of those who own one car at 2001) have lesser risk of death than those who do not own a car, whilst those who live with others at 1991 and 2001 have a lesser risk of death. Finally, unmarried adults at both 1991 and 2001 have a greater risk of death than the reference category (married and unmarried adults with no children) whilst one parent families and married and unmarried families with dependent children have a lesser risk of death at 1991 and 2001 than the reference category.

Table 6-1 Results from logistic regression modelling predicting the bivariate relationship between each independent variable and the Mortality outcome variable

Bivariate (unadjusted) links between independent variables and Mortality outcome variable		1991 (n=42604)		2001 (n=41587)	
Variable	**Category**	**OR**	**95% CI**	**OR**	**95% CI**
Age	Age (centred)	1.09***	1.08,1.09	1.09***	1.08,1.09
Age Squared	Age Squared	1.00***	1.00,1.00	1.00***	1.00,1.00
Sex	Male (reference)	1		1	
	Female	0.9	0.81,1.00	0.88*	0.79,0.98
Marital Status	Single (reference)	1		1	
	Married	4.07***	3.43,4.84	4.42***	3.72,5.26
	Widowed	3.03***	2.26,4.05	5.37***	4.25,6.79
	Divorced	20.97***	17.56,20.05	20.60***	17.21,24.69
Social Class	Professional (reference)	1		1	
	Managerial	0.93	0.39,2.19	0.79	0.41,1.50
	Skilled and non-manual	0.83	0.35,1.95	0.83	0.44,1.57
	Skilled-manual	1.62	0.71,3.70	1.91*	1.03,3.54
	Partly-skilled	1.19	0.51,2.76	1.23	0.66,2.29
	Unskilled	1.59	0.68,3.73	2.00**	1.06,3.77
	Never worked	4.71***	2.1,10.57	3.44***	1.88,6.27
Qualifications	No qualification & NCR persons under 18 (reference)	1		1	
	Sub-degree	0.56*	0.35,0.52	0.28***	0.15,0.53
	Degree & higher	0.37**	0.18,0.74	0.47***	0.32,0.68
	Not stated	1.91***	1.46,2.50	3.57***	2.94,4.33
Ethnicity	White (reference)	1		1	
	Non-white	0.20**	0.06,0.63	0.18**	0.68,0.48
House Tenure	Owner occupied (reference)	1		1	
	Social renting	2.07***	1.82,2.34	2.11**	1.88,2.37
	Private renting	1.21	0.87,1.67	1.62**	1.31,2.00
Central Heating	Central heating (reference)	1		1	
	No central heating	1.09	0.97,1.23	1.2	0.98,1.46

Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	0.22***	0.20,0.25	0.12***	0.10,0.59
	0 cars (reference)	1		1	
Car ownership	1 cars	0.34***	0.30,0.38	0.91	0.68,1.21
	2 cars	0.22***	0.16,0.29	0.30***	0.22,0.41
	3 cars	0.10***	0.03,0.28	0.11***	0.07,0.16
Household type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	1.15**	1.03,1.29	1.21**	1.08,1.35
	One parent families with dependent children	0.05***	0.02,0.12	0.10***	0.05,0.19
	Married and unmarried couples with dependent children (reference)	0.03***	0.01,0.08	0.07***	0.530.11

Up to this point, the analysis of the impact of the SARP programmes on the outcomes used in this analysis has not uncovered evidence of a regeneration effect and it should be noted that there is an association between mortality and the outcomes I have investigated in previous chapters. For example, self assessed health has been found to be a good predictor of mortality in several previous studies (Wood et al. 2006). Given that I found no evidence of a positive or negative regeneration effect using the self-report outcome LLTI, it may therefore be intuitive to expect that the results from the analyses undertaken here will not demonstrate positive regeneration effect for residents in regards to reducing incidence of death. However, if we return to summary statistics presented in Chapter 3, these demonstrated that whilst both SARP and comparator areas experienced a drop in mortality; this was more pronounced in comparator areas. In 1991 the areas that were to be given SARP status in 1996 had an all-cause mortality rate of 3.26 per cent, whilst comparator areas at that time had a similar rate of 3.27 per cent. At 2001 SARP areas had a rate of 3.23 per cent whilst there was a 2.97 per cent in comparator areas. This was unexpected and it may well be that by 2001 the programme had not been in place long enough to make an impression on mortality rates. However, in this analysis I extend the time lag to 2004 which allows an additional three years to observe a regeneration effect in residents in SARP areas relative to comparators. Nevertheless, this remains a relatively short time period within which to observe a mortality effect and I therefore hypothesise

(hypothesis 1) that, by the 2001-2004 period, the programme will not have had an impact strong enough to display to a statistically significant decrease in the risk of all-cause mortality relative to residents in comparator areas.

Table 6-2 below presents the results of the repeated cross sectional analysis designed to investigate the incidence of all-cause mortality among residents in SARP areas compared with residents in comparator areas at the baseline period in 1991-1994 and then again in the period 2001-2004, five years into the programme and beyond. As expected, the baseline models A, B and C demonstrate no significant difference in the risk of death between residents in the regeneration areas to-be and those in comparator areas, which demonstrates that the regeneration and comparator areas are well matched at the baseline. At the 2001-2004 period the results for Models A and B appear to support hypothesis 1, however Model C 2001-2004 demonstrates that hypothesis 1 cannot be upheld as once the analysis controls for a range of household and individual variables SARP residents are at greater risk of death (IRR=1.12, $p<0.05$) than comparator residents. This therefore mirrors the summary statistic on mortality mentioned above and indicates that, despite eight years of the SARP programmes (1996-2004), residents in these areas suffer from higher mortality incidence than their counterparts in comparator areas. This finding may therefore indicate that the time period covered here is not sufficient to note changes in mortality, despite the fact that 8 years' time-lag post initiation of an area regeneration programme is longer than many other studies have been able to employ.

The results also demonstrate that the profile of the individual who has the highest risk of mortality is mostly consistent at both time periods. For example, at both baseline and 2001-2004 Model B shows that residents who are older and male are at higher risk of death, which in regards to age is what is expected and with regards to sex, is consistent with previous literature that has routinely found that men have a lower life expectancy than women (Leyland et al. 2007). However in regards to marital status, at baseline divorced residents had the greatest risk of death compared with single residents (IRR= 1.30, $p<0.01$) whereas by 2001-2004 it was widowed individuals who were at greatest risk of death (IRR= 1.35, $p<0.05$). These results are also consistent with previous literature that has found that the death of a spouse for those that are widowed, or the dissolution of marriage for the divorced, can be a stressful and dramatic event which has a major effect on health (Johnson et al. 2000).

Model C across both time periods also shows that older, male residents are at highest risk of death. In regards to marital status the results mirror Model B in that at baseline divorced residents are at the highest risk of death compared to those who are single (IRR= 1.40, $p<0.01$). However, by 2001-

2004 none of the marital status categories are significantly different to single individuals as regards risk of death. Model C also indicates that permanently sick residents have the greatest risk of death compared to those in full time employment, which is expected and stable across the two time periods (IRR=3.17 p<0.001 at baseline and IRR= 3.77 p<0.001 at 2001-2004). Beyond this finding the baseline model for Model C shows that those who are unemployed are the next economic status category with higher risk of death compared with those in full-time employment (IRR=1.88, p<0.01), which is again consistent with previous literature (see, for example, Lundin et al., 2010). However, at 2001-2004 those categorised as 'other inactive' have the greatest risk (IRR=2.28, p<0.01) of mortality relative to full-time employed residents. This change may be due to the rise in 'non-employment' in disadvantaged areas as a result of de-industrialisation, whereby many former blue-collar workers transitioned from employment to being in receipt of sickness and incapacity benefit (Green and Owen, 1998).

Both time periods for Model C show that occupying a social rented property is a characteristic associated with increased risk of death. At baseline, social renters had an incidence rate ratio significantly higher than home owners (IRR= 1.17, p<0.05), whilst by 2001-2004 the risk of death for this group had increased in both effect size and significance (IRR=1.35, p<0.001). It is expected that renters in general will experience greater risk of mortality than homeowners (Blackman 2006) as homeowners generally have better physical and mental health outcomes and higher self-esteem, which all boost wellbeing. However, within the renting population, previous work (e.g. Macintyre et al. 2000) has found that those who rent social housing are more likely to be in worse health than private renters due to exposure to stressors such as perceptions of stigma and low prestige, whilst exposure to undesirable neighbours, poor quality of dwelling and remoteness of landlords further compound these ill effects for residents of social rented property compared to those in privately rented accommodation.

In addition, the results from Model C concerning whether residents live alone or not generated a surprising finding in that, at baseline, those who live with others appear to have a higher risk of death than those who live alone (IRR=1.17, p< 0.05). This is surprising as previous literature indicates that living alone can have an adverse effect on health due to issues pertaining to social isolation and potential resultant conditions such as depression (Pulkki-Rabak et al. 2012), the experience of which has been found to increase the risk of mortality (Cuijpers and Smit 2002). However, by 2001-2004, the opposite and expected effect is found as it is those who live with others who have a lower risk of death than those living alone (IRR=0.80, p<0.05). Moreover, Model C 2001-2004 demonstrates that those who do not own a car are at a greater risk of death compared to those who do own cars. This

was not found in the baseline model but a correlation between car ownership and lower mortality risk has been established in previous research (Asthana and Halliday (2006:477). Lastly, in regards to household type, Model C 2001-2004 shows that couples with dependent children have a lower risk of death than couples with no dependent children (IRR=0.57, $p<0.01$).

Table 6-2 Repeated cross-sectional area change in incidence of all-cause, all-age mortality in 1991 and 2001

Mortality (incidence risk ratio) 1991 and 2001		1991						2001					
Variable	**Category**	**Model A (n=42604)**		**Model B (n=42604)**		**Model C (n=42604)**		**Model A (n=40723)**		**Model B (n=40278)**		**Model C (n=38231)**	
		IRR	**95% CI**	**IRR**	**95% CI**	**IRR**	**95%CI**	**IRR**	**95% CI**	**IRR**	**95% CI**	**IRR**	**95% CI**
Area Type	Control area (reference)	1		1		1		1		1		1	
	Regeneration area	1.00	0.90, 1.12	0.99	0.90, 1.1	1.00	0.90, 1.21	1.08	0.97, 1.21	1.11	0.99, 1.23	1.12 *	1.00, 1.26
Age	Age			1.06 ***	1.05, 1.07	1.05 ***	1.04, 1.07			1.08 ***	1.07, 1.09	1.06 ***	1.05, 1.08
Age Squared	Age Squared			0.99	0.99, 1.00	1.00 *	1.00,1.00			0.99	0.99, 1.00	1.00	0.99, 1.00
Sex	Male (reference)			1		1				1		1	
	Female			0.55 ***	0.49, 0.61	0.60 ***	0.53, 0.68			0.62 ***	0.55, 0.70	0.63 ***	0.56, 0.71
Marital Status	Single (reference)			1		1				1		1	
	Married			1.01	0.84, 1.21	1.11	0.80, 1.53			0.86	0.72, 1.03	1.19	0.89, 1.59
	Widowed			1.13	0.84, 1.51	1.08	0.80, 1.46			1.35 *	1.06, 1.71	1.29	1.00, 1.66
	Divorced			1.30 **	1.08, 1.57	1.40 **	1.16, 1.70			0.96	0.79, 1.16	1.04	0.84, 1.27
Social Class	Professional (reference)			1		1				1		1	
	Managerial			0.80	0.34, 1.89	0.74	0.30, 1.81			0.71	0.38, 1.36	0.54	0.28, 1.04
	Skilled and non-manual			0.95	0.41, 2.22	0.78	0.31, 1.96			0.84	0.45, 1.59	0.51	0.26, 1.00

	Skilled-manual	0.97	0.43, 2.22	0.76	0.31, 1.86	1.08	0.59, 1.99	0.56	0.29, 1.07
	Partly-skilled	0.84	0.37, 1.99	0.63	0.25, 1.57	0.90	0.48, 1.68	0.48 *	0.24, 0.92
	Unskilled	1	0.43, 2.35	0.74	0.29, 1.86	1.21	0.64, 2.27	0.56	0.28, 1.10
	Never worked	1.72	0.77, 3.87	1.11	0.46, 2.71	1.17	0.64, 2.15	0.57	0.29, 1.10
Economic Status	In full-time employment (reference)			1				1	
	In part-time employment			0.90	0.53, 1.52			0.64	0.33, 1.23
	Self-employed			0.95	0.45, 1.99			1.29	0.63, 2.62
	Unemployed			1.88 **	1.30, 2.71			1.70	0.95, 3.02
	Student			1.44	0.34, 6.08			1.64	0.59, 4.58
	Permanently sick			3.17 ***	2.36, 4.25			3.77 ***	2.74, 5.19
	Retired			1.48 *	1.10, 2.00			1.95 ***	1.40, 2.74
	Other inactive			1.24	0.88, 1.74			2.28 ***	1.60, 3.25
Qualifications	No qualification and NCR Persons under 18 (reference)			1				1	
	Sub-degree			0.92	0.55, 1.52			0.91	0.48, 1.74
	Degree and higher degree			0.98	0.45, 2.12			0.72	0.47, 1.27
	Not stated			0.97	0.74, 1.27			0.93	0.72, 1.21
	Over 75 with qualification			0.82	0.68, 1.00			0.94	0.73, 1.21

Ethnicity	White (reference)	1		1	
	Non-white	0.82	0.26, 2.59	0.19	0.02, 1.37
House Tenure	Owner occupied (reference)	1		1	
	Social renting	1.17 *	1.03, 1.34	1.35 ***	1.19, 1.53
	Private renting	0.95	0.68, 1.32	1.20	0.95, 1.51
Central Heating	Central heating (reference)	1		1	
	No central heating	0.95	0.84, 1.06	1.05	0.86, 1.28
Persons living in the dwelling	Living alone (reference)	1		1	
	Not living alone	1.17 *	1.00, 1,38	0.80 *	0.67, 0.97
Car ownership	0 cars (reference)	1		1	
	1 cars	0.88	0.76, 1.01	0.78 **	0.68, 0.90
	2 cars	1.11	0.81, 1.52	0.69 *	0.50, 0.95
	3 cars	0.62	0.23, 1.67	0.41 *	0.18, 0.94
Household Type	Married and unmarried couples with no dependent children (reference)	1		1	
	Unmarried adult	1.11	0.81, 1.52	1.28	0.95, 1.71

	One parent families with dependent children			0.6	0.23, 1.52				0.81	0.42, 1.56
	Married and unmarried couples with dependent children			0.95	0.68, 1.33				0.57 **	0.37, 0.87
	Log Likelihood	-8052.8053	-6854.16		-6779.38	-7404.78	-5739.9			-5234.73

* p<0.05, **p<0.01, ***p<0.001

Section 6.4 Discussion and *Conclusion*

The objective of this chapter was to investigate if living in SARP areas has had a positive or negative impact on the risk of suffering mortality compared with living in similarly deprived comparator areas that did not receive the programme. To address this question I conducted a repeated cross-sectional analysis where all age groups were included. The results of the analysis demonstrated that by the 2001-2004 period, residents in SARP areas were at greater risk of mortality than comparator area residents, thus suggesting that the programme may actually have had a negative impact on mortality risks in SARP areas. Hypothesis 1 was therefore upheld as the programme did not reduce the risk of mortality for SARP residents compared with comparators.

Given the strong relationship between health and mortality, this result is surprising as the previous chapter found no evidence to suggest that the SARP programme had a negative impact on the two morbidity measures, however there is a possibility that the morbidity outcomes used in the previous chapter may have been unable to pick up on negative impacts that resulted in the increased risk of mortality. Thus, perhaps for example, poor mental health issues (which have not been able to be accounted for in this analysis) contributed to this increased risk of mortality. Indeed, certain previous studies of area regeneration and health have at points uncovered that issues pertaining to the process of regeneration have resulted in negative mental health impacts. For example, neighbourhood upheaval particularly in terms of housing demolition, decanting and rehousing may have significant negative implications for mental health (Cave and Curtis 2001). In addition, Kearns et al. (2008) found that that moving from a flat to a house as part of a regeneration process, which can for some mean moving to a new area entirely, impacted negatively on the mean size of local social networks, which in turn meant that residents from regeneration areas were more likely to be lonely than non-regeneration area resident. The authors concluded that,

> "perhaps the disruption of regeneration, especially if it does involve moving neighbourhood for people...is likely to have negative effects on people's social integration." Page 42.

It is therefore feasible that the SARPS programme caused disruption of social networks which may in turn have acted as a source of stress that led to the increase in mortality risk found in this chapter.

Kearns et al. (2008) also found that older retirement-age residents in particular suffered worst from the disruptive effects of housing regeneration and were more likely to be taking mental health medications following regeneration than comparator area residents. Similarly, , Gosling (2008) found that housing renewal as part of a regeneration programme was particularly distressing for older or

single residents in that these residents were found to be least likely to be allocated new homes in their area after the regeneration process:

> "...the regeneration of the estate had caused great frustration, disturbance, uncertainty and upset for many on the estate, tearing apart existing local friendship and community networks. Thirdly, the newly regenerated estate would include a far smaller number of rented homes, rent charges would be higher and, moreover, homes were unlikely to be allocated to many existing residents, such as those labelled 'old' and 'single'." P.609.

Whilst I am unable from the results above to say whether or not the SARP programme impacted more negatively on older people than others in the community, resulting in an increased likelihood of mortality, there does appear to be growing interest in the literature on how area regeneration impacts on older people in particular. It is clear that the SARP programmes placed a great deal of effort on improving employability of residents however less is known about specific initiatives to improve the health and well-being of older community members leading one to question whether the well-being needs of older individuals are given an appropriate level of consideration by those implementing regeneration initiatives. This therefore links back to the thesis conceptual framework and the importance of effective implementation and community engagement for the success of an area regeneration programme. Indeed, a qualitative study by Simpson (2010) on the engagement of older people with neighbourhood renewal in England found that older people's engagement in regeneration policy-making was limited, whilst age discrimination coupled with a lack of older people's personal skills capacity appeared to hinder engagement. Thus, as stated above, it appears that the disruption of social networks may act as a significant stressor that can cause ill health.

Further negative impacts of area regeneration practices that may help to shed light on the results found in this chapter can be viewed in Kearns et al. (2009) who discuss the potential negative health impacts of relative deprivation and income inequality as a result of attempts to alter community composition in regeneration areas through mixed tenure policies. These policies are often at the root of housing regeneration strategies and Kearns et al. (2009) ponder whether mixed-tenure policies are the correct way to regenerate areas, stating that equality of social status (even if low status) might work to provide more cohesion and thus protect residents within communities from negative forces resulting from inequities in areas. Illustrating the pathways within which they hypothesise income inequality and relative deprivation arising from mixed tenure policies to negatively impact on health they state that:

> "income inequalities operate through psychosocial and biological mechanisms. In relation to the former, the less well-off suffer from a loss of self-esteem, lower levels of control over their lives, weaker social networks and exclusion; and these things in turn are associated

with higher levels of health damaging behaviour, such as stress-related smoking, drinking and eating comfort foods." Page 66.

Thus, we can perhaps theorise that the increased risk of mortality for SARP residents relative to comparators at the 2001-2004 period may be directly attributable to mixed tenure strategies that were undertaken as part of the initiative, which had subsequent negative impacts on health through relative deprivation and income inequality processes. If relative deprivation and income inequality issues were to blame for the increased risk in mortality at 2001-2004 then again one would suspect that the morbidity outcomes in Chapter 5 would not pick up on this. Instead it would be more realistic to imagine that mental health morbidity outcomes would perhaps have indicated similar findings that would link to the increase incidence of mortality for SARP area residents relative to comparators noted here. This can be said as the pathways to poor health caused by relative deprivation and income inequality are mental rather than physical. For example, Gerdtham and Johannesson (2004) state that a low relative income may be associated with increased psychological stress which can be damaging to health. A further potential explanation for the results observed above is that selective migration processes facilitated by initiatives within the regeneration programme have seen healthy residents move away from the area, perhaps after seeing employment outcomes improved, which has left more unhealthy individuals in the SARP areas. However, the selective migration analysis from the previous chapter did not find that those who moved out were more likely to be healthy so this hypothesis can perhaps be discounted.

Finally one factor that should be returned to is the time-lag issue in regards to mortality. Cotterill et al. (2008) hypothesised that it may take 10 or even 20 years to get a proper picture on the impacts of regeneration on mortality rates (Cotterill et al. 2008) However, this chapter has provided evidence to demonstrate that an 8 year time-lag has been sufficient to show a potential mortality impact. However, this was of course negative and I cannot be certain that the SARP programme itself was responsible for the greater incidence rate of death at the 2001-2004 period. Thus, longer term data should be employed when available in order to revisit the impacts of the SARP programmes have had on mortality and thus this is a topic that could usefully be the subject of future research.

The objective of this chapter was to investigate whether the SARP programme had a positive or negative influence on all-cause mortality. Based on the results of the analysis I therefore conclude that the overarching finding of the chapter in relation to the central research objective is that living in a SARP area appears to have had a negative impact on the risk of mortality for residents. I have used the discussion section above to explore reasons for this finding which is surprising given that no increased likelihood of morbidity for SARP area residents was found in the previous chapter.

However, I have used the evidence above to suggest that the pathways leading to this increased mortality risk pertain more to the negative impacts of certain regeneration processes on mental health outcomes, which I was unable to capture in this thesis. These processes that have been theorised and indeed found in some studies, to impact negatively on mental health relate in the main to the disruption caused to the lives of residents by large scale housing renewal. In particular we have seen evidence above to suggest that having to move house as part of the regeneration process can be damaging to mental health especially for older residents. It has also been theorised that the policy goal of creating mixed tenure communities that is often at the heart of hosing regeneration can, once realised, have negative impacts on mental health through relative deprivation and income inequality processes, which has led Kearns et al. (2009) to question whether achieving mixed tenure communities is the correct goal to adopt for area regeneration strategies.

With that said, the next chapter shifts the geographical scale of the study to look in-depth at how the SARP programme was implemented and to gauge how it was perceived by local residents.

Chapter 7 Experiences of SARP Area Regeneration: the case of 'Parkhill'

Section 7.1 Introduction

Each of the previous three chapters used three distinct analytical techniques (repeated cross section, selective migration and difference in difference) with quantitative data from the Scottish Longitudinal Study (SLS) to investigate the impact of the SARP programmes on four outcomes; unemployment, limiting long term illness, hospital admissions and mortality. The findings indicated that the programmes appear to have had no significant impact (positive or negative) on the health and well-being of SARP area residents relative to comparator area residents on the unemployment and morbidity outcomes but did find that SARP area residents had an increased risk of mortality at the 2001-2004 period. In addition, the findings did not support the often stated hypothesis that those who move out of regeneration areas have done so because they have benefitted from the programme and been replaced with residents who are likely to be more deprived.

The overall objective of this chapter is to conduct a qualitative study in a former SARP area in an attempt to explore potential explanations for why no evidence of the programme having been successful was found on any of the outcomes. By investigating how the programme was practically implemented and how it impacted on the lives of residents, I theorise here that it may be possible to shed light on potential limitations of the quantitative modelling in order to gain a fuller understanding of why no regeneration effect was noted on three of the four outcomes assessed in the quantitative modelling chapters.

Despite the fact that the quantitative modelling has been able to improve on the only previous evaluation of SARP programmes (Tyler et al. 2001) particularly by providing an estimation of the counterfactual, accounting for population turnover and including the Priority Partnership Areas that converted to Social Inclusion Partnerships, there are potential limitations within this modelling. For example, the group defined as 'remainers' within the selective migration modelling may have a heterogeneous element that is not picked up in the analysis. Any moves in between the two contact points of 1991 and 2001 that may have been due to regeneration processes (such as decanting or general selective migration out and back in to the area) will have been missed. There may also have been delays in certain areas where no regeneration investment was made until later than the modelling assumes. This can happen when for example, disagreements within regeneration partnership bodies regarding regeneration priorities delay the commencement of certain initiatives (e.g. Maginn 2007). Thus, if this has occurred in SARP areas the time-lag value of the SLS data will be depleted in terms of reducing the important time-lag to observe a regeneration effect. Including all

SARP areas together in one analysis therefore cannot account for heterogeneity in the ways regeneration programmes are initiated in specific areas. In addition, there are also further possible regeneration effects that SLS variables cannot capture. Whilst quantitative data can be used to report outcomes for employment, morbidity and mortality there are other positive and negative outcomes that impact on individual well-being. For example, population turnover caused by regeneration may break existing friendship networks and thus be detrimental to well-being, whilst improvements to housing quality and reputation may on the other hand increase residents' self-confidence and sense of belonging. Thus, the personal views, attitudes and expectations that residents' have towards the SARP programmes cannot be understood through the analysis of available quantitative data.

This chapter, therefore, uses insights from qualitative interviews with residents of one SARP area and selected key informants to shed light on potential reasons why no regeneration effects have been observed in the previous analyses and to investigate whether the failure to uncover an effect can be attributed to the limitations of the modelling. In this chapter the geographical scale shifts from whole of Scotland to one SARP area. It should therefore be noted that, as with all qualitative research, the central limitation of this phase of the research is that the findings are not generalizable to the wider population. However, within the wider mixed method approach adopted in this study, this in-depth phase nevertheless facilitates the ability to triangulate the findings of the previous chapters.

As was stated in Chapter 3 of this thesis, 16 semi-structured interviews were undertaken, 11 of these were with residents and a further 5 were conducted with key informants from the local authority and health service who were directly involved with the implementation of regeneration activities in Fife. The interviews took place during November and December 2011.

Table 7-1 Overview of the residents, n=11

Name (pseudonym)	Age	Sex	Occupation
Harry	50	Male	Shop worker
Margaret	64	Female	Shop worker
Charlie	39	Male	Shop worker
Ryan	45	Male	Permanently sick
Flora	41	Female	Shop worker
Kara	22	Female	Student
Cheryl	55	Female	Retired
Thomas	33	Male	HGV driver
Brian	33	Male	Community worker
Roy	51	Male	Council worker
Greg	29	Male	Student

Table 7-2 Overview of the key informants, n=5

Name (pseudonym)	Occupation at time of the SARP programmes
Steven	Locality manager/Regeneration Manager
Debbie	Health promotion officer
Pat	Locality Manager
Julie	Community Warden
John	Housing officer

Three research issues are investigated in this chapter:

4. The facilitators and barriers to successful programme implementation
5. The programme's influence on population turnover
6. Residents' perceptions of the programme and engagement with initiatives

These issues were identified as *a priori* themes in Chapter 3(Data and Methods) stemming from the information presented in Chapter 2 and thus the thesis conceptual framework. To recap, the first and third issues were included in the thesis conceptual framework as intermediate issues that can affect health and well-being outcomes. The second issue was also alluded to in the conceptual framework as an area-level determinant related to the success of the programme and thus its ability

to impact positively on health and well-being given that previous work such as that by Cole et al. (2007) has postulated that those who 'get –on' through the programme may move away to more affluent areas. In addition, the previous chapter theorised that population turnover can potentially damage mental health (for older people in particular) through the disruption of established social networks.

References to these *a priori* themes were included in an interview guide that was developed in order to ensure that the interviews stayed on topic. Each of these three *a priori* themes was supported by the data. In addition a fourth emergent theme was found pertaining to the accounts of both residents and key informants regarding what factors were involved in causing the decline of the area. Thus, four central themes were identified in the data:

Accounts of area decline: setting the scene – which discusses residents' and key informant recollections of the area prior to the implementation of the SARP programmes in order to set the scene for the remainder of the discussion. **The importance of the area regeneration partnership: facilitators and barriers to successful programme implementation** – which describes the challenges faced by those implementing the programme. **Regeneration-induced population turnover in practice**– which discusses how elements of the regeneration programme impacted on population turnover. **Impacts of Physical, Social and Economic Regeneration on health and well-being:** – which discusses the impact of the wider holistic regeneration programme on residents' health and well-being and investigates residents' perceptions of the programme initiatives. Responses on all four themes are then used to enhance understanding of the quantitative results.

Section 7.2 Accounts of area decline: setting the scene

The qualitative study was conducted in an area of a Scottish town, essentially a large housing estate of around 8500 people, with a long term history of multiple deprivation. To preserve the anonymity of the area I will refer to it as Parkhill from this point onwards. Parkhill was subject to both the Regeneration Partnership (1996-1999) and Social Inclusion Partnership (1999-2006) programmes that made up the wider Scottish Area Regeneration Partnership approach to area regeneration. However, prior to this the area underwent initial major development in the 1950s and 1960s when several large blocks of flats were built in the area. This development appears to have been pivotal in the history of the area as the blocks of flats, which were initially very popular with local residents, eventually came to represent and symbolise the decline of the area, and were finally demolished as part of the SARP programmes. Explaining this, Margaret who was born in Parkhill but moved out in the early 1970s and then moved back in the early 1990s said:

> "When I was a child everyone actually wanted to stay in the new flats, especially the maisonettes. This was a new concept then and everyone was dying to get in there but by the time I got back everyone was dying to get out, no one would dream of wanting to stay there, there was a lot of damp. It was really really awful... very much deteriorated. So things had went completely downhill." (Margaret, resident aged 60)

All residents interviewed articulated how they felt issues to do with the blocks of flats had impacted on themselves personally and also the area in general. One central issue was that the flats had been erected in a circular formation in the centre of Parkhill, a design which was widely lamented as impacting negatively on well-being among residents who felt they were surrounded on all sides by these buildings. For example, Harry stated:

> "…you were totally enclosed all the way around in the centre. You could barely see the sky. It was horrendous. People felt claustrophobic and it wasn't exactly eh…conducive to healthy living put it that way. The housing caused a lot of problems in my opinion." [Harry, resident aged 50]

This feeling that the design of the built environment in Parkhill contributed negatively to well-being was also mentioned by one of the key informants who articulated his impression of Parkhill when first going there to work on the regeneration projects:

> "What you tended to have were these flats around the perimeter or periphery of the estate so it gave a pretty...it looked pretty bleak I have to say when you first went in there. We had very high void rates in these flats as well, so not only were you coming into an area ringed by blocks of flats, the vast majority were actually empty and boarded up." (Steven, Locality Manager and Regeneration manager)

However, in addition to the design and layout of the flats, many residents interviewed also commented about anti-social behaviour problems in the area which some attributed mainly to occupants of the flats. From discussions with the key informants who had been involved in implementing the regeneration programmes in Parkhill it appears that for an unspecified period before the regeneration programme began, the blocks of flats were used by the local authority as a place to house people who had become homeless or in desperate need of accommodation. This included a range of people, from young families who were in financial difficulties to individuals with drug and alcohol problems. This is explained by one of the key informants:

> "I worked in as a housing officer back in 92, 93 and at that stage if you were homeless you got a property in Parkhill. Now, this wasn't happening during the main regeneration period but certainly in the years leading up to the start of the regeneration. Parkview had been an area where people who were homeless for a wide range of reasons, were given houses." (John, Housing Officer)

Residents were aware of this. For example Margaret stated:

> "I think as well, over the years the Council tended to band everyone up in that area. It started out as a new housing estate all those years ago; it then got run down so everybody who was in dire need of housing got put there rather than get put some place nicer."

And Ryan commented:

> "Well a lot of people were put to Parkhill because it was basically a dumping ground...the Council created a ghetto. You know, all the bad tenants landed there, and anyone coming into the town who wasn't from the area and didn't know what Parkhill was like would get offered a house." (Ryan, resident aged 45)

On discovering this I set out to recruit individuals to the study who had experience of being allocated one of the flats after becoming homeless to understand more about what it was like to live in these flats. For example, one lady explained how, after the end of her marriage which rendered her homeless, she and her young daughter were allocated a shared flat in Parkhill:

> "We were homeless basically; I was put in the homeless unit. They had a homeless unit in Airlie Street (pseudonym) in Parkhill, these were all flats. We lived there, it was just, you know...a nightmare to be in that situation because what you were doing is sharing a living room, bathroom and kitchen area. You have your own bedroom but you have a lock on that. My daughter and I were sleeping in a double bed together. So you didn't have any privacy really." (Flora, resident aged 41)

A similar account of marriage breakdown being the catalyst for allocation of a flat in Parkhill is told by Margaret, which illustrates the anti-social lifestyles of certain occupants of the flats:

> "We had come from quite a well off area so it was a bit of a culture shock when we moved to Parkhill but it was to do with circumstances regarding my husband at the time and we had nowhere else to go. The flat was horrible and we were there for five years before I got moved to a nicer house in the area. You learned to look after yourself, you definitely had to do that, if you didn't have a backbone you were absolutely scuppered, you really were. You had to meet these people on your own terms...I had a drug dealer downstairs and there was a woman up the stairs who, for want of a better description was a lady of the night. It was just horrendous. And I've got four sons. Two had left the house but two were still with me."

Whilst problems pertaining to the blocks of flats were the key issue that residents thought was wrong with the area before the regeneration began, there were other factors that residents associated with the decline of Parkhill leading to the regeneration of the area. For example, many of the residents interviewed complained that there were problems with lack of services in the area. Firstly, a lack of shops:

> "We used to have the CO-OP up there, a big CO-OP but that was shut down. That was a massive CO-OP, it had clothes, it had furniture and everything in it but it closed and became a derelict building at the back. If you wanted to do your shopping you'd have to go out of the area to one of the big supermarket and trial back on the bus with all your bags. You couldn't do your shopping in Parkhill because there was nothing there." (Cheryl, resident aged 55)

In addition, there were concerns around a lack of health services in the area:

> "We had to go into the town for the doctors or dentist, and that was a fair bit away, quite a distance if you've got to scout about on buses with wee ones." (Flora, resident aged 41)

This was also highlighted by one of the key workers interviewed:

> "…the fact that there wasn't a GP in the local clinic in Parkhill was a massive issue. What happened was that people would go to and register with different GP's around the various catchment areas of Parkhill, but not necessarily visit any one of them" (Debbie, Health Promotion Officer)

A further issue that was mentioned in the interviews was the distinct lack of green space in Parkhill prior to the regeneration. For example, Ryan stated:

> "We had tennis courts and a bowling green in the centre which weren't used and as I say there were in disrepair. In the other parts there was no lighting and you certainly would avoid those areas at night if you were taking animals for a walk. You know, it was very non-sociable shall we say and the parks didn't invite people to go into them. Obviously gang culture was quite high as well in the area and youths were going about in packs." (Ryan, resident aged 45)

This was confirmed by the interviews with key informants who prioritised the provision of green space as part of the regeneration:

> "There was a serious lack of places to be active in the area also...people would have to get a bus to go to a decent park for example." (John, Housing Officer)

The interviews with the key informants also yielded some helpful general perspectives on the health issues in the Parkhill area. For example, the following excerpt from one interview outlines the key health problems in the area:

> "When I came to area in 1998…in terms of health the big issue was heart disease and people were dying early from preventable issues...a lot of smoking, a high prevalence of smoking. There was also quite a degree of mental health issues as well.... It was very difficult to get people to be active, a lot of people walking around quite obviously obese. There was also a feeling that people were just down about the area and that things weren't going to get any better because they felt that new people kept coming in and promising change in the area that was never delivered." (Debbie, Health Promotion Officer)

As Debbie came to work in Parkhill in 1998, this comment is significant as it indicates that the initial SARP programme (the Regeneration Partnership programme) may not have had a noticeable impact in the area and may have been delayed in getting started, which is exemplified in her stating that change had been promised but was not delivered. If there were delays then it may confirm one of the potential limitations of the quantitative modelling set out in the introduction of this chapter. For example, the modelling assumes that the regeneration began in 1996, giving a five-year time-lag to note changes in likelihood of unemployment and LLTI and eight-year time-lags for likelihood of hospital admissions and incidence of mortality. However, if in some cases SARP initiatives did have

delays in the programme being implemented then the ability of the modelling to uncover a regeneration effect will be hampered by a shorted than assumed time period over which to observe any effects. These issues are discussed in the next section where the participants, particularly the key informants, provide recollections of how the programme was implemented which allowed light to be shed on the first research issue outlined above (*facilitators and barriers to successful programme implementation*).

Section 7.3 The importance of the area regeneration partnership: facilitators and barriers to successful programme implementation

It became apparent through the interviews with the key informants that the first of the SARPs programme, the Regeneration Partnership (RP) was beset by difficulties and that the regeneration of Parkhill did not appear to get underway until the RP programme was converted to a Social Inclusion Partnership in 1999 following the election of New Labour in 1997. A key initiative that had failed to get off the ground during the RP period was a housing stock transfer. To illustrate this, Steven, who started work in the area in 1999 stated:

> "when I started to work in the area, they were just about to go through the stock transfer process and many things that were to come off the back of...many of the things that would have gone towards fulfilling wider regeneration such as things like employability, the idea was that this would come off the back of the housing stock transfer. So not long after I moved there the request for a ballot for a housing stock transfer was refused by elected members. So that whole sort of premise on what the regeneration was going to be built on in Parkhill was blown out the water, so it was a very difficult period of time. I think we basically picked over the bones of what was proposed in terms of wider regeneration as part of the housing stock transfer process and tried to wed it together with the SIP objectives which brought some funding into the area and it allowed us probably to deliver some of the stuff that we managed to put together." (Steven, Locality Manager and Regeneration Manager)

Irrespective of the potential positives and negatives of undergoing a housing stock transfer process, the problems that occurred in implementing and ultimately abandoning this process demonstrate that an area regeneration programme can be beset by delays, emanating from disagreements within the partnership that is set up to deliver the programme.

This observation has profound implications for the assumptions of the quantitative modelling used in the previous chapters if these types of delays had also occurred in other areas. With that in mind, the literature on the workings of regeneration partnerships would suggest that disagreements resulting in delays are indeed common place (e.g. Ball and Maginn 2005). Thus, the implications are that the time-lag, which is a crucial element in studies such as this where adequate time is needed in order to note improvements in health and well-being outcomes following the regeneration process

(e.g. Cotterill et al. 2008) is not as lengthy as the modelling assumes which may well be a contributory factor that can explain why no regeneration effect was noted in Chapters 4-6.

However, the picture gets more complex as interviews with other key informants confirmed that some regeneration work had been undertaken during the RP period, which therefore suggests that negative impacts on the time-lag potential may not be quite as debilitating as stated above (albeit that it is not possible to generalise from the findings of this study to other areas). For example, Debbie stated:

> "Some demolition of flats in the area had happened as I remember before I got there, though not the main ones in the centre. That wasn't done as part of the major regeneration master plan. I don't know if that was done as part of another programme. I just remember the councillor saying to me OK, we have had these flats demolished but what are we going to do about cleaning up the aftermath? So, the demolished areas had become brownfield sites that needed an environmental and physical upgrade. But it just goes to show how things had not been joined up, joined up thinking. You had a block of flats demolished with no firm plans as to what was going to be done with the site afterwards." (Debbie, Health Promotion Officer)

This quote provides three main points for discussion. Firstly, the quote confirms that regeneration work had been taking place when Debbie arrived to work in area in 1998 (in the form of demolition of blocks of flats). One would assume this was conducted as part of the RP programme. However secondly, it is interesting that Debbie seemed unaware of the name of the RP programme. This is surprising as it was a major national flagship initiative of the time (Tyler et al. 2001). Nevertheless, thirdly it is also suggested that there was no clear regeneration plan in place during the RP period as evidenced by Debbie stating that there was no firm plan to develop the site where the demolition had taken place. This is further noted of the regeneration strategy in general before the RP became a SIP:

> "My recollection is a bit hazy. But there was not something called a regeneration plan at the time but there was a move towards that approach." (Pat, Locality Manager)

The second and third of the above points have important implications for the results of the quantitative modelling undertaken in the previous chapters and also for the quantitative evaluation of area regeneration programmes generally. For example, in regards to point 2, Debbie's lack of awareness of the main regeneration programme operating in the area at that time suggests that there may have been other regeneration money in the area at the time or indeed other programmes. With that said the interview with Steven confirmed that this was indeed the case:

> "It was quite a complicated cocktail of funds because you had people like development services at the time who also had capital money for spending in the regeneration areas on projects as well so, as I say you have a bit of a cocktail of funds there was SIP money, there

> was money coming through development services there were other local budgets if you like; all to a greater or lesser extent were targeting regeneration be it physical or social or whatever." (Steven, Locality Manager and Regeneration Manager)

This highlights a key difficulty in evaluating regeneration programmes at the area level as often other small initiatives may be going on alongside the main project and possibly also in other disadvantaged areas that did not have the official regeneration status. The existence of smaller projects therefore acts as a confounding factor that may serve to boost the regeneration effect in one area over another but also could reduce the validity of an area-matching approach if they have been implemented in comparator areas. For the quantitative analysis undertaken in this thesis great care was taken to ensure that the comparator areas were not subject to any regeneration work, however it is extremely difficult to completely rule out the possibility that small projects may have been undertaken in certain comparator areas.

In regards to the third point arising from Debbie's quote, it appears from the interviews with the key informants that specific awareness of the RP programme was negligible. However the key informants were all aware of changes when the RP was changed to a SIP. This quote from Debbie's colleague Pat illustrates this point:

> "I think at the stage of the late '90s we were still in a position where the main issue was the blocks of flats in the centre and what we were going to do about them...were they going to be demolished, were they going to be refurbished with new heating and windows which were so badly needed. The refurbishment plans were really akin to sticking a plaster on to a boil. This is what we were saying at that point. Then something happened within the Council, they must have put a bid in for funding as all of a sudden there were a number of official regeneration areas in the region and Parkhill was one of them. Those areas were chosen as total regeneration schemes. We then got new regeneration officer postings." (Pat, Locality Manager)

It would seem therefore that when the RP programme evolved into SIP in 1999 a more concerted, detailed and visible regeneration effort was initiated. However, according to Taylor (2002), no increase in funding was planned, which is perhaps surprising as one may expect, on reading Pat's account, that the higher profile and visibility of SIPs may have been on the back of increased investment which facilitated this increase in visibility. From the interview with Steven, it appears that the composition of the regeneration partnership had changed when the change to SIPs was announced; it had become more unified, perhaps learning from previous issues with the RP partnership:

> "But probably over and above all of that we finally had a very very good group of people. In terms of the right people in the right place at the right time. That was definitely it from education to the police to the health service to other services within the council; we just had the right group of people." (Steven, Locality Manager and Regeneration Manager)

Thus, the overriding feeling among the key workers was that the regeneration in Parkhill never truly got underway until the transition to the SIP phase of the SARPs programmes. This is evidenced by the following commentary from Debbie when discussing the changes after the SIP phase began:

> "There were four posts managed by housing at the local authority with strong links to the locality manager and they were there essentially to manage the process basically. They were very involved in the consultations with different contractor prices and proposals and also what do local people think about the plans and for us we were interested in what can we get from this that can add value to the area beyond just new housing. So all that was going on and from my perspective we were getting money to invest in health issues. And at the same time we had people in the area saying you know, 'aye right' because they heard all of this before, but this time it had a head of steam behind it and it happened." (Debbie, Health promotion Officer)

However, in addition to this Steven drew attention to the time it takes to get the larger regeneration projects up and running:

> "And yeah no matter which way you wrap it up the biggest issue was always the timescale, why does it take so long to do things. We delivered a number of projects, I might have already said this but there were the two big community projects by members of the community and they took years to deliver. It was almost like people had to be convinced in their own mind that what they were hearing, what they were involved in was actually a good thing. Things do take a number of years to deliver." (Steven, Locality Manager and Regeneration manager)

The timescale it takes to deliver larger projects was also found to be problematic in terms of the implications for residents' perception of the success of the programme. Having the local community on-side has routinely been found to be critical to the success of area-based regeneration (Forrest and Kearns 1999). For example Steven stated:

> "I think one of the other things that I very much found out in Parkhill is the importance of confidence levels among the community. Are they confident that things are happening? We went through a long spell with people not feeling that anything was happening so that was quite a difficult thing." (Steven, Locality Manager and Regeneration Manager)

Similarly, Pat revealed:

> "There was a lot of cynicism amongst residents because they were hearing about all these plans for change in the area but it's hard for your average resident to be aware of the softer, social regeneration that goes on. It's the big physical projects that tend to get the attention, so the likes of the park and then the emptying and demolition of the flats and the new build housing, these big visible projects had a big impact and were in effect a turning point that made people think, well wait a minute, this is actually happening now we can see tangible results." (Pat, Locality Manager)

Many residents did indeed confirm their frustration at the time it took to see results of the SARP programme confirming that it is often large projects like housing renewal that are most likely to elicit recognition that a regeneration programme is underway:

> "It seemed to take a long time to change things. I know they were supposed to be pouring money into things but you couldn't actually see it. Looking at it saying that's what that money bought...I think there was a lot of money done on surveys and things but that was a lot of wasted money that could have went somewhere else." (Cheryl, resident aged 55)

As described in Chapter 2 of this thesis, partnership working has been identified as crucial to the area regeneration process. The success of area regeneration schemes may be directly contingent upon the success of the partnerships that attempt to implement them. By 'success' I refer to all partners having an equal voice in regeneration proceedings, or at least an unambiguous sense of the role and power each partner has. However, Forrest and Kearns (2003: 47) point out that this aim is problematic as, within partnerships,

> "… both local authorities and other public agencies are often involved in several partnerships at once in a competitive funding regime, meaning that, alliance and commitments end up fluctuating in strength or shift altogether as centrally determined opportunities or priorities change."

Providing an example of a problematic partnership, Jones (2002: 3) explains that community in-fighting, lengthy delays and resentment at government control and highly paid consultants, have beset programmes such as the New Deal for Communities and have cast doubt upon the ability of partnerships to deliver equitable social inclusion. Flaws in the workings of certain partnership initiatives serve to hinder the progress and success of regeneration initiatives and Jones (2002: 4) argues that some professionals continue to make the mistake of thinking that they know what is best for communities.

This also raises a potential further limitation of the quantitative modeling, which does not account for heterogeneity in programme delivery contexts among the SARP areas. By this I mean that it may be the case that some SARP partnerships did not function as well as others, ultimately hindering programme delivery. This of course cannot be established by a single case study; however one of the key informants (Steven) provided an interesting insight in this regard. Following his work in Parkhill, Steven moved to take up a locality manager post in another disadvantaged area that had also been a SARP area in the same administrative region. Steven noted that the programme there appeared to have been less successful than in Parkhill and commented on why this may have been:

> "That's also the difficulty of moving things on to other areas, have you got the right personalities involved? I think just lifting a carbon copy and posting it somewhere else...you know I've noticed big differences between the communities here and the community in Parkhill, and we're in the same county. In terms of chips on people's shoulders and...You know just subtle things. Whereas in my opinion in Parkhill people were just a bit more relaxed about letting you get on with things, whereas through here people tend to be a bit more sceptical about things. Now whether that is due to experiences they have been through before or whatever I couldn't possibly say but that's within one county. If you try

> and transplant this to Aberdeenshire or someplace you're into a whole bunch of other problems. You're doomed to failure if you implement it without prime people involved." (Steven, Locality Manager and Regeneration Manager)

It is therefore my conclusion that the evidence provided here represents and exposes factors that can feasibly be labeled as limitations to the assumptions of the quantitative modeling. It is conceivable that the occurrence of partnership problems delayed the initiation of an area regeneration programme thus reducing the time-lag within which to note regeneration effects. Furthermore, the evidence presented here also demonstrates that it takes time to get regeneration projects off the ground, which also emphasizes the need for long-term follow-up data to gauge the impacts of regeneration initiatives on health and well-being outcomes. The following section presents and discusses what was found to shed light on the second research issue investigated in this research (*the programme's influence on population turnover*).

Section 7.4 Regeneration-induced population turnover in practice

Following the transition to the SIP phase of the programme, the regeneration of Parkhill seems to have moved ahead swiftly. In particular, all interviewees spoke at length regarding the work that was undertaken to regenerate the housing in the area, which is unsurprising given that this appears to have been the primary focus of concern for residents in Parkhill. A key issue of interest that was pursued in the interviews was to investigate potential heterogeneity amongst those defined in the quantitative modelling as 'remainers' in regeneration areas from 1991 to 2001. For example, it is clear from previous literature that decanting policies were pursued during demolition of inadequate housing in regeneration partnership areas in Scotland (e.g. Atkinson and Kintrea 2002). Parkhill was well known as an area that had undergone significant demolition of blocks which therefore made it a good choice to investigate this heterogeneity. This is important as decantees have been found to suffer from a range of adverse health and well-being impacts such as disruption of social networks, loneliness, stress and anxiety (Glasson and Wood 2009). Firstly, the following excerpt from the interview with Steven outlines how elements of the failed housing stock transfer initiative were resurrected in order to drive the housing renewal:

> "I think in terms of em... (Inaudible) the housing situation. We had come off the back of a process that was blown out of the water that would have delivered you know arguably what we were looking for. So we had to come up with another process and I was heavily involved with the housing association and various council services in putting together a deal that delivered exactly what we were going to do as part of the stock transfer...but we got rid of the stock transfer part of it if you see what I mean. And I think overall it was about a £14 million pound deal. So I was heavily involved in that and it's still delivering as we speak, there are still houses getting built that were part of that initial deal. I think the deal has probably changed slightly since but it involved the developer, it involved the housing

> association and it involved the council and we actually contractually tied in together so that worked really well."(Steven, Locality manager and Regeneration Manager)

The regeneration partnership in Parkhill decided that the central focus of the physical regeneration effort would be to conduct wholesale demolition of the blocks of flats that had been viewed as blighting the area and build houses in their place. This is a common approach that has been at the cornerstone of similar regeneration projects, with the aim of creating mixed-tenure communities (Graham et al. 2009). The implications of this process for the local population were significant. For example, the extent of the demolition and build process led to a vastly reduced housing stock in the area and, rather than have individuals and families waiting lengthy periods to return to new build houses, the partnership decided to permanently resettle the vast majority of residents living in the blocks of flats as opposed to decanting them temporarily. Explaining this process, Steven stated:

> "Obviously we needed to start somewhere and the first thing we needed to do was demolish properties to create land to build on and at that stage there were no new houses for people to move into. So what we did was we permanently moved people. So rather necessarily than decanting them for a period of time which could have been up to two or three years in all honesty, we took the decision to re-settle people as much as we possibly could. So in that early round most of the people, in fact all of the people were permanently re-housed. We gave them the option to stay in Parkhill; we gave them the option to move elsewhere in the wider town or elsewhere in the region." (Steven, Locality Manager and Regeneration Manager)

This strategy therefore meant that interviewing decantees in order to explore heterogeneity amongst those defined in the quantitative modelling as 'remainers' was not possible. Furthermore, the local authority were unable to authorise details and addresses of individuals who were permanently resettled elsewhere, thus this phase of the work was unable to locate and recruit any of these residents to the study. However, many of the residents that were interviewed had good recollections of the demolition and build process. One of the residents provided his view:

> "Well a lot of people were decanted out of the existing housing that had to come down...the flats. A lot of these people couldn't get back in. These people were decanted from Parkhill to a neighbouring town and there was other places throughout the town… So you know they cleared out a lot of tenants, with problems as well, and some of them have come back and there is problems within that but because it's not Council and it's housing associations it's harder to... see if you are a Council tenant and misbehave you can actually lose your tenancy whereas it seems to be harder for a housing association to do that." (Ryan, resident aged 45)

Similarly, another resident stated:

> "Don't get me wrong, things here now are better than they've been for a long time. I admit that. But they couldn't house all the people that were here simply because there aren't as many places to stay now. All the flats have went pretty much and been replaced by houses.

> They couldn't all stay here, some of the worst ones have been moved on. Six or 8 flats to a block and that's just one house now." (Harry, resident aged 50)

However, this process of permanently relocating numbers of residents was criticised by another of the key informants, for concentrating the focus of the programme on regenerating the physical area rather than the population:

> "there were a lot of people from the private housing sector who were given contracts to come into the area to do proposals on what the new look of the area was going to be and what housing was going to be demolished. What then happened was where people with poor health were, the poorest people in those houses, what you do is you displace them into other areas, either the next Parkhill waiting to happen or somewhere else. What you then do is bring in people with a better health record with that same postcode and it looks like you've improved the health of the people of Parkhill but have you really?" (Debbie, Health Promotion Officer]

And somewhat surprisingly, some residents also commented on the issue of moving certain people out of the area:

> "Things got better in the areas where the problem people were moved out, that's clear but it's not a surprise. If you knock down massive blocks of flats and replace them with shiny new houses and select who gets to move into them then it's no surprise that the profile of the area will improve. But what happens to the places where the worst people go? I think the work in the area has been good in these areas...the housing work I mean. But you can't as easy renew people in the same way and you can't wipe away all the bad opinions that people have of the area just by building new houses." (Kara, resident aged 22)

Kintrea (1996) pointed out that in the move towards regeneration partnerships in Scotland, the then Scottish Office prioritised tenure change and increase in owner occupation to create high-profile projects to demonstrate how declining areas could be transformed. The Parkhill approach thus appears to have been in that mould. There appears therefore to have been an element of gentrification occurring within Parkhill following the erection of new build housing in place of the blocks of flats:

> "We've got a lot of city commuters now. It's about 69% owner occupiers now in the area…it used to be 30% apparently. We've had a lot of incomers coming in from other areas in Fife due to the Fife letting policy. And it's very hard for people who actually want to stay in Parkhill to now get a house. You know if their families have grown up. And they want to stay within the area due to the new Fife Letting policy; it's not a case of if you come from that area you will automatically get a house." (Thomas, resident aged 33)

Another participant spoke of how the stigma of being a resident in the Parkhill area was slowly changing following the housing renewal and change in housing stock to new build houses:

> "But it's so different now because there are so many private houses up here now...It's getting better like I say because you're getting more decent people in." (Cheryl, resident aged 55)

Furthermore, Cheryl went on to illustrate how the housing renewal programme has shaped the mixed-tenure milieu in her immediate locality:

> "The majority of these houses are private. Across from me there's six...across the road from me these are all private and then you get to the flats at the bottom...coupla houses at the bottom, they are Council. And behind that is Council and on the left side and right side they're all private and these people are paying 160-170 thousand to live here. They've got to build so many private and so many for association, it's just Council so they're all mixed and we don't have a problem here." (Cheryl, resident aged 55)

It is apparent from the information given in this section that the general population in Parkhill was transformed in both number and composition as a direct result of the SARP programme, particularly in the SIP phase. This issue is, in essence, one of the key points that this thesis attempts to address with the statistical modelling strategy, as the lack of a consistent population is one of the primary problems challenges when attempting to evaluate the impact of an area regeneration programme. It is clear also that this was recognised by some of the key informants. For example Debbie stated:

> "The idea we had was for a longitudinal study that would track people not postcodes to see whether regeneration really did improve health. Because it has been proven that regeneration doesn't improve health but actually makes it worse. If you have an older person who is used to living in a tenancy and move them somewhere else then this disrupts their social contacts and disorientates them generally, it doesn't help. And again, if an older person lives in a flat sometimes walking the stairs is their only serious activity. If you move them into a ground floor one level house they lose that activity source which again impacts badly on their health. So sometimes it's not always good to do that sort of regeneration. However, I know that the planned longitudinal study didn't get off the ground. The study was a good idea though because we really needed to get an idea of what was happening to the people who were originally in the regeneration areas and follow them over time, but it didn't get off the ground." (Debbie, Health Promotion Officer)

One hypothesised limitation of the modelling used in the previous three chapters pertains to the possibility that some of those defined as 'remainers' in regeneration areas could have been decanted elsewhere and returned between 1991 and 2001 as part of the housing renewal process. Their mobility would, therefore, not have been picked up in the modelling. As we have seen there is potential for harm to the individual well-being of those who are decanted, yet this level of detail cannot be accounted for in the statistical modelling. However, in the case of Parkhill, very little temporary decanting took place. Rather, the strategy was primarily one of permanent resettling. If this also happened in other SARP area, then the modelling assumption that those who remained in the area from 1991 to 2001 did so without being decanted and moved back again in the intervening period may not be misleading. However, no data are available that summarise decanting strategies for all SARP areas. Thus, the extent to which the models escape criticisms in this respect is unclear**.**

The following section presents the data gained from the interviews that facilitated understanding of the third research issue (*residents' perceptions of the programme and engagement with initiatives).*

Section 7.5 Impacts of Physical, Social and Economic Regeneration on health and well-being: residents' perceptions of the programme and engagement with initiatives

A further opportunity to investigate the results of the quantitative modelling is presented by the accounts that participants provided regarding the impacts of various physical/environmental, social and economic aspects of the programme. The quantitative modelling observed no regeneration effect on any of the outcomes assessed, thus to try and further explain these results it is important to understand how residents felt that the initiatives comprising the programme had actually impacted on their lives.

Section 7.5.1 Impacts of physical/environmental projects:

Section 7.4 detailed the extent of housing renewal that was undertaken as part of the SARP regeneration of Parkhill and in response to this, the vast majority of residents articulated positive feelings about this part of the regeneration. For example, Roy stated:

> "I suppose you could say that the new housing has helped improve the image of the area, and we're maybe all a bit happier with it…a bit prouder of the place you could say" (Roy, resident aged 51)

However, other residents felt that improving housing alone would not lift the stigma that was perceived to surround the area:

> "I think they have done a really good job here with the houses. I can remember the old flats and things look a lot nicer now. They have regenerated the area but it's a lot harder to regenerate other people's opinions of the area. Parkhill is always going to have a bad reputation no matter how much money is poured into it. People outside the areas have negative views." (Brian, resident aged 33)

However the general physical appearance of the area underwent a further major physical and environmental project in addition to the housing renewal. This improved green space, as Steven explained:

> "So we put together an environmental project or actually a series of environmental projects and three big ones in particular. And that was probably a couple of million quid's worth. And that went down extremely well because it was almost like a breathing space for the local community if you like. Because it's so tightly knit and there weren't many green spaces and the ones that were there weren't particularly well used. So we did make quite a major transformation to one or two of these areas and that brought a sense of pride back." (Steven, Locality Manager and Regeneration Manager)

This again was spoken of positively by the vast majority of residents, albeit grudgingly by some:

> "It's really good. It's now like a village within a city which was the plan I think. You know the park was improved much to my disgust as I didn't agree with the amount of money that was spent on it, but it has done its job" (Ryan resident aged 45)

Indeed no resident spoke negatively about the park:

> "… the park is the lungs of the area. It's a green space that everyone can use. The other parks on the other side have also been improved with lighting which makes it a more safe environment for walking. So you don't have to go out the area...I'd say that at one time I spent most of my time in the town centre. Now I only go seldom into the centre because you can do everything here." (Harry, resident aged 50)

The physical and environmental regeneration of the area therefore appears to have been a success amongst those residents' interviewed. All residents' interviewed spoke positively about the housing renewal save for the concerns about people who were moved into other areas. The improved green space areas were also universally praised amongst the sample. However, no residents interviewed stated that they had become inclined to be more active as a result of this provision, so whether or not these aspects of the regeneration programme improved the health and well-being of local residents is unclear.

Section 7.5.2 Impact of enhanced health service provision:

The Parkhill regeneration programme also brought in new health services to the area such as a GP practice and dental surgery. However, it was acknowledged that this would probably not have happened if it was not for the fact that a large private housing estate (called locally the 'Eastern Expansion') of around 4500 houses was being built on a farmland area contiguous to Parkhill at the same time as the SARPs programme was in place. Illustrating this, Steven stated:

> "Parkhill had never had a surgery in spite of all the health issues that were there. We managed to work with the NHS and offer them a site in Parkhill to site the surgery for the whole eastern expansion and the people of Parkhill could apply to join. So I suppose that was a good thing in terms of...it's not necessarily preventative healthcare although that obviously does go on there, but it's in terms of having healthcare facilities in the area, so that was successful and subsequently there was a dental surgery built. We were able to facilitate with the land we had available to us as a council so that all kinds of stuff happened." (Steven, Locality Manager and Regeneration Manager)

This also appears to have had a universally positive impact on the residents interviewed:

> "Well here in Parkhill the lack of health services was appalling for such a large area. The opening of the doctors was a big issue and has had a massive positive impact." (Greg, resident aged 33)

At the same time, certain residents were aware of the circumstances around the provision of the two surgeries and voiced the kind of fatalism about the prospects of the area that Atkinson and

Kintrea (2002) stated contributes to the reproduction of inequalities and feelings of social exclusion in disadvantaged areas:

> "You have the new doctor and dentist surgeries here now, but they are only here because of the Eastern Expansion. If that hadn't happened Parkhill wouldn't have these services. The people who moved into the Eastern Expansion housing all work in the city, they don't come into Parkhill at all and aren't part of the community." (Kara, resident aged 22)

In terms of the quantitative outcomes investigated in the previous three chapters, perhaps the most significant of the above interview data is the issue concerning the new GP practice that was built in the Parkhill area as part of the regeneration programme. Deprived areas have been found to have less access to GPs than affluent areas, whilst practices in deprived areas also tend to have poorer facilities and quality of care (Leese and Bosanquet 2005), and the story from Parkhill prior to the SARP programme confirms this. It has been found in previous research (e.g. Gulliford (2002) that higher supply of GPs results in lower hospital utilisation from acute or chronic conditions, thus it is feasible that, as a result of the provision of the GP practice, health in Parkhill would have improved over time. However, the surgery in Parkhill was built in 2004 so again the time frame offered by the SLS data misses the impact of this.

Section 7.5.3 Impacts of health projects:

In addition to the above, interviews with key informants also yielded descriptions of initiatives that were conceived as part of the SARP programme's health improvement strategy. The strategy focused on four key areas: smoking cessation, tackling alcohol abuse (particularly amongst younger members of the community) through educational programmes, improving breast feeding rates, and improving the diet and nutritional knowledge of the local population via provision of cheap fruit and vegetables and nutritional education classes. The following excerpt from the interview with Debbie explains the broad philosophy behind the health improvement approach:

> "… the whole idea of the health needs in the area were around the social determinants of health and what you need to do to address those determinants and changing and that life situations in order to make the healthier choices the easier choices, and that was the approach essentially from the health service perspective. But to get that in place isn't one agencies responsibility alone, therefore it has to be a number of partners all coming together to achieve that." (Debbie, Health Promotion Officer)

While the ambition to improve residents' health was an integral part of the regeneration strategy, it is clear from the key informant interviews that many of the health related projects were difficult to sustain:

> "Stuff around a counsellor for mental health issues, smoking cessation, trying to promote breastfeeding but ending up giving out a lot of formula milk. That sort of stuff is what we did

> at the local clinic. So we had all of these initiatives that were little gems if you like but hard to sustain over the long term." (Pat, Locality Manager)

The interviews with residents demonstrated limited awareness of the health improvement projects that had been undertaken, which reflects what was stated in the comment above by Pat. However, two initiatives in particular were commented on, namely the subsidised fruit and vegetable project that was run within another project called the 'health bus'. The health bus was project funded by the Primary Care Trust, run by volunteers and occasionally had a nurse on board who resident s could discuss health issues with. Its main objective was to provide access to subsidised 5-a-day fresh fruit and vegetables and also educate local residents on how to cook with these ingredients as many residents were found to have negligible cooking skills and instead frequently used local take a ways. This illustrated in the following quote:

> "you only have to look at the amount of take a ways there are in the area. For the size of the area, how it supports...there is two chip shops, there is a Chinese, an Indian. I mean honestly there is a big issue with the diet as well. And I come in to that bracket as well I suppose. You know there are times when I've eaten out the chip shop five days a week...just for easiness ye ken. It's right on your door step and it's cheap. So you can easily just eat from the chip shop rather than cooking your tea!" (Brian, resident, aged 33)

Nevertheless, another resident Ryan explained how the heath bus project had a particular positive impact on his life:

> "Well the health bus did because I found out from that that I was type 2 diabetic actually! And if I hadn't gone along I would have been in ignorance, I had the classic signs of diabetes. So eh, it was a shock to me when I got told because as an ex-nurse, I thought I would have recognised that I was ill." (Ryan, resident aged 45)

This underlines the value of this project in making a tangible difference to the health of residents in area. However, interviews with the key informants highlighted that whilst this project was popular, it ultimately did not have enough community support in terms of finding residents to help with the running of the initiative. For example, Debbie states:

> But the difficult thing with that and the reason that it ultimately folded was that the committee, it was run by the community for the community and it was only a core few on the committee and they became overloaded and in the end couldn't cope with everything they had to do, so there was an issue with not being able to engage more local residents." (Debbie, Health Promotion Officer)

Overall it was apparent from the interviews that many residents simply had not engaged with many of the health initiatives and indeed some of the respondents were unaware of these projects that had been undertaken as part of the SARPs programme. This is not altogether surprising as these findings show that there was an apparent brevity to the projects and lack of a strategy to keep the health promotion and education initiatives going. This suggests that the impact of these initiatives

on LLTI or hospital admissions would not be as significant as initiatives such as the provision of the GP practice.

Section 7.5.4 Impacts of employment initiatives:

From the interviews, it is clear that the majority of residents believed that the area had declined rapidly during the period of de-industrialisation from the late 1970s onwards. The area is situated in close proximity to traditional blue collar industries such as shipbuilding and mining that are now either defunct or offer significantly fewer jobs than in decades gone by:

> "A working community is important. If you've no got a working community and everyone's unemployed then what do they do? Thing will turn bad and that's what happened here." (Harry, resident aged 50)

Coupled with that, residents believed that the stigma of being from Parkhill ensured that their employment prospects were more limited than others in better off areas:

> "There was a stigma to say you were brought up in Parkhill. And you're judged on that. It would affect your chances of getting a job… it would affect if they could trust you but then you have to prove yourself." (Cheryl, resident aged 55)

To counteract unemployment issues, it appears that the focus of the SARP programmes in Parkhill broadly aligned with the sorts of supply-side measures that were outlined in chapter 4 such as provision of training, education and job placements:

> "We also had employability initiatives. One was called pathfinders run by the benefit agency that came in after the SIP designation…paths to employment, where things like job placements were arranged. That also involved helping people gain the skills to apply for jobs… classes on sorting out CVs and training that we could get them into and highlighting courses that would improve the employability of some of the residents. So that was the focus on the employability angle." (Debbie, Health Promotion Officer)

However Debbie also made reference to the demand side of the employability equation, saying:

> "But it's also about trying to get the jobs there in the first place." (Debbie, Health Promotion Officer).

As mentioned above, during the SARP regeneration period in Parkhill, a large area of farmland contiguous to Parkhill was earmarked for a sizeable development of private housing not connected to the regeneration programme. With this development a large leisure park including cinema, restaurants and other major retail outlets were planned, which subsequently brought job opportunities to the locality. With this in mind Steven stated:

> "In terms of the social side of things we did quite a bit of work around the leisure park which was being built at the time round about where the Odeon is ... And we got in at the planning application stage there and we got things like guaranteed job interviews and such like up

there so we were able to do some things with that." (Steven, Locality Manager and Regeneration Manager)

This highlights how those charged with implementing the SARP regeneration programme in Parkhill also took an opportunistic approach to capitalising on initiatives occurring in other areas. However Steven also remarked with hindsight that a key opportunity was missed in regards to the houses that were being built in the private development:

> "I suppose that would be one of the critical things, not critical of SIP but critical of the wider picture. There were 4500 houses built in the Eastern Expansion and whilst I'm sure some people from Parkhill were employed in some of those industries none of it was on purpose. To the best of my knowledge there wasn't a single job created on purpose if you see what I mean as part of any strategy. You know that is 4500 houses. So that was a bit of a missed opportunity, however people did get jobs at Tesco's and various other places that were being built. I think in terms of employment and employability we were able to make a bit of a difference." (Steven, Locality Manager and Regeneration Manager)

No residents interviewed had been aware of the pathfinders initiative that Debbie had spoken of even though several had faced unemployment at certain points over the regeneration period. Employment for many of the respondents was the key to helping the area improve. For example Roy stated:

> If you have work that's the main thing. Going back you know, when I was growing up in the 70s everyone had something to do, I was in the mines. There wasn't many folk out of work then I'll tell you. You could leave one job and start another the next day. But unemployment has become massive for people. And then dealing drugs has become easy money for a lot of them. There's no opportunity is there?" (Roy, resident aged 51)

Similarly, Cheryl made the connection between employment and well-being, emphasising that long term generationally transmitted worklessness was a problem in the area:

> "But I think with regeneration...if people's home life becomes better then their health becomes better. I think there is a vast majority of people here who have never worked and it just goes from family to family. The mum never worked so they never work and if your father never worked...that's how it goes, that's what goes on around here. Except for all the new bits here. But I'd say the regeneration has done a good thing in some ways but it is lacking in other ways." (Cheryl, resident aged 55)

This sub-section has provided a mixed picture in regards to what the SARP programme achieved for the area in terms of employment. It is clear that attempts were made to improve supply-side issues, however the impact of these are unclear. In addition, in terms of demand side measures, those implementing the initiative attempted to capitalise on developments happening around the area to ensure Parkhill residents could share in the benefits that these developments brought to the wider area in terms of newly created jobs. If successful efforts such as this are to be commended, however there are implications for the present evaluation. For example, the quantitative analysis is based on

comparing geographically defined areas over time, however this analysis cannot account for developments such as the Eastern Expansion that are not connected to the regeneration programme that may have a bearing on employment outcomes in the regeneration area.

Section 7.6 Conclusion

This chapter has used qualitative semi-structured interviews with residents and key informants in an attempt to explore local experiences of regeneration in an attempt to understand why no positive regeneration effects were uncovered in the quantitative analyses undertaken in chapters 4, 5 and 6. To this end three general research issues were investigated:

Three research issues are investigated in this chapter:

1. The facilitators and barriers to successful programme implementation
2. The programme's influence on population turnover
3. Residents' perceptions of the programme and engagement with initiatives

The investigation uncovered several points that could possibly have implications for both the modelling strategy undertaken in the previous three chapters and also, therefore, the modelling results. In terms of the barriers and facilitators to successful programme implementation, two points emerged from the analysis that have implications for understanding the quantitative modelling.

Firstly, the various issues that contributed to delays in SARP initiatives starting suggests that the time-lag that the SLS data provides to observe regeneration effects was over-estimated. This limitation applies particularly to the LLTI and unemployment outcomes whereby the data time period extends only to 2001. It is therefore feasible that any health impacts that could affect LLTI, such as housing renewal and environmental regeneration, may not be picked up by the modelling if similar delays had also occurred in other SARP areas. Similarly, the main employability initiative (pathfinders) was introduced following the transition to SIP, which again limits the ability of the data to pick up regeneration effects. This may therefore explain why no regeneration effect was found in the modelling for these outcomes. The time-lag given by the quantitative data (up to 2004) was longer for both hospital admissions and mortality. However, in regards to mortality we have seen previously in this thesis that for this particular outcome, it may take around ten years to note regeneration impacts. However, the previous chapter did note a result indicating that living in SARP areas had a negative impact on all-cause mortality. Furthermore, in terms of hospital admissions, the provision of the GP practice could potentially have had the greatest impact on this outcome, was not built until 2004. Thus if the implementation of the SARP programme in Parkhill was mirrored in other areas, the issues around the length of time required to implement and deliver some of the major

facets of the regeneration programme may well explain why the quantitative modelling did not note a regeneration effect on any of the outcomes assessed.

Secondly, a troublesome issue arising from section 7.3, and one that has implications for this evaluation, is the finding that other smaller initiatives not funded by SARP money were taking place in the Parkhill area in conjunction to the main programme. It appears that those delivering the intervention adopted an approach whereby they felt that in order to make the most of the area renewal process they would attempt to source additional funding streams when they became available:

> "…it's quite difficult to separate out the SIPs from a number of other things that were going on. Though my opinion is that the SIPs programme was very much integral to what was going on with the regeneration process. There were the financial aspects that came along with SIP and also the statistical information that came off the back of it as well. So both of those things influenced what we did because it gave us the main resources and it gave us the information to deliver on things." (Steven, Locality Manager and Regeneration Manager)

This has a confounding effect in a study such as this where one particular funding stream is being evaluated. It is also especially problematic if these other smaller initiatives have been implemented in comparator areas.

In regards to the second research issue, it is clear that the programme had a significant impact on population turnover in the area. The housing stock was vastly reduced through the process of demolishing several blocks of flats, replacing these with mainly low level houses and adopting a decanting policy that in the main permanently resettled large numbers of residents out with the area rather than bringing them back after a period when the new housing was built. This therefore reflected well on the quantitative modelling strategy that could not account for a decanting process that moved residents out of the area and then back.

In regards to residents' perceptions of the programme and the implications these have for the quantitative modelling, opinions varied depending on which facet of the programme was being discussed. For example, all respondents spoke positively of the impacts that the physical and environmental renewal had on their subjective well-being in terms of sense of pride in the area. As a consequence of this enhanced sense of well-being, we might expect that certain improvements in health outcomes would ensue over time. However, as it has been established that the physical and environmental projects may not have been picked up in the modelling due to the time delays, one longer term data would be needed to pick up on positive health impacts from such initiatives as stated above. In terms of the health initiatives that were undertaken, roughly half of the residents interviewed had no experience or recollection of these. Others knew and valued initiatives such as

subsidised healthy food whilst one participant in particular had received a potentially life changing diagnosis of diabetes after engaging with the health bus initiative. Overall, the evidence on this facet of the SARP programme suggests more could have been done to engage residents. It is clear from the interviews with key informants that there was no firm strategy in place to successfully sustain health promotion projects and that these were delivered in a rather piecemeal fashion. In terms of evaluating the quantitative modelling, the findings in regards to the SARP health initiatives suggest that such initiatives would be unlikely to impact positively on health outcomes unless they were delivered in a more sustainable and effective way.

In summary, the most salient findings from this chapter are two-fold. Firstly as most of the major initiatives appeared to have been initiated during the SIP phase of the project, the ability of the quantitative data to note regeneration effects on the selected outcomes is limited if these delays also occurred in other SARP areas. Secondly the finding that smaller initiatives not funded by SARP funding were occurring in the area act as potential confounding effects as the modelling assumes that all SARP areas were subject to the same funding stream and comparator areas had no regeneration funding.

Chapter 8 Conclusion

Section 8.1 Introduction

Over £11 billion has been spent on area regeneration initiatives in the United Kingdom over the last twenty-five years. The potential to combat deprivation, improve health and reduce health inequalities is often used as justification for such a large-scale investment. Nevertheless, evaluation of these initiatives has been sporadic, often producing conflicting results. Some regeneration programmes appear to show positive effects on health and socio-economic status; others show no, or even a detrimental effect. This may, however, be attributed to difficulties in designing appropriate evaluation studies rather than the effects of regeneration. For example, few studies have been able to follow individuals over time so that their changing circumstances can be investigated and more closely related to the regeneration processes that they experience. Other evaluations have relied on comparing population characteristics in an area before and after regeneration, ignoring the fact that the resident population may have changed substantially during this period.

Evaluating area regeneration programmes is therefore a challenging process and the programmes themselves are complex interventions serving heterogeneous populations. With this thesis I have firstly demonstrated the need that currently exists to understand more about the impact that the SARP initiatives have had on residents' health. I have also attempted to address some of the key challenges associated with evaluating area regeneration by contending that the most effective way to carry out an evaluation of an area regeneration programme is to conduct a mixed-methods study whereby an initial national-level quasi-experimental phase is followed up with a qualitative phase in order to validate the results of the initial phase. I have shown how data from the Scottish Longitudinal Study (SLS) can be employed to track individuals over time and extend the time-lags for observing changes in health outcomes beyond those used in many previous studies. Lastly, the thesis has shown how propensity score matching can been employed in order to obtain a robust measure of the counterfactual. In this concluding chapter, I revisit each of the three thesis objectives outlined in Chapter One and outline the key findings. Following this I highlight the advantages and limitations of the study before commenting on opportunities for further research. Finally I present a discussion on the policy implications of the thesis and refer back to how the results of this work relate to the thesis conceptual framework outlined in Chapter 2.

Section 8.2 Revisiting the thesis objectives

Section 8.2.1 Did the SARP programme have a positive or negative influence on health and well-being outcomes in Scotland?

The first objective of this study was to investigate whether the SARP programme had a positive or negative influence on health and well-being outcomes for the target populations. This objective was investigated in the quantitative phase of the study. Using the methodological process I outlined in Chapter 3, a series of models was used to examine whether the SARPs had a positive or negative impact on unemployment, morbidity and mortality.

Unemployment is conceptualised in this thesis as an indirect indicator of health and well-being. With this in mind, the modelling undertaken with this outcome as a dependent variable demonstrated that the SARP programme has had no impact (positive or negative) on the likelihood of unemployment for regeneration area residents compared with their comparator area counterparts. I interpreted this finding as lending support to arguments put forwards by authors such as Turok (2004) who argued that the SARP programme should have focused less on the supply-side approach to tackling unemployment and more on the demand-side of the employment equation in order to encourage investment in disadvantaged area and ultimately create jobs.

Morbidity was investigated in Chapter 5 using both a subjective measure (LLTI) and an objective measure (hospital admissions) of ill health. Again the modelling demonstrated that the SARP programme had no impact (positive or negative) on an individual's likelihood of experiencing morbidity for either measure. In interpreting the reason for these results I questioned whether lack of participation in the programme by local residents was responsible for the absence of an effect or whether the time lag used in the study was long enough to pick up on regeneration effects pertaining to morbidity, given that previous research has hypothesised that time lags of over ten years would be required to note impacts on morbidity following the area regeneration process (Cotterill et al. 2008).

The final outcome to be assessed in the thesis was mortality. In this case we observed that living in a SARP area appears to have had a negative impact on the risk of mortality for residents compared with comparators. This was a surprising finding given that no increased likelihood of morbidity for SARP area residents was found. However, I suggested that this finding may, pertain more to the unobserved negative impacts of certain regeneration processes on mental health outcomes. This study aimed to evaluate how the SARP programme impacted on mental health in addition to the outcomes employed here, however no appropriate data could be sourced. This is discussed below.

In the absence of this data however, I consulted previous literature that has considered the impacts of area regeneration on mental health. With this in mind I found evidence to suggest that regeneration processes such as large-scale housing renewal have been theorised to impact negatively on mental health through processes such as the disruption caused to the lives of residents. Thus these processes occurring in SARP areas may have acted as a source of stress that led to the increase in mortality risk found in this chapter.

The quantitative analyses were designed to provide as robust an evaluation as possible within the limits of the data available, and lead to the conclusion that the SARP programme had no positive impact on residents' health and well-being, whilst there was also clear indication that the programme actually impacted negatively on residents' longevity.

Section 8.2.2 Were there differences in health and well-being outcomes between those who remained in SARP areas and those who moved in and out?

The second objective of this thesis pertained to one of the most notable challenges of evaluating the impacts of area regeneration on health and well-being, namely the lack of a consistent population as people move out of and in to regeneration areas. This movement could of course be facilitated by a regeneration programme as people who have their health and socio-economic situations boosted by the programme may elect to move out to areas perceived as being more desirable. Such mobility can become problematic for a deprived area if out-movers are replaced by workless in-movers who may also eventually make the same transition to employment and move out; and so the cycle continues. Thus of this occurs persistent population churn ensures that the neighbourhood's unemployment profile (and the overall level of deprivation) does not change. However, in the case of SARP areas the analyses did not find any indication that these processes had occurred.

In terms of unemployment, it seems that regeneration area migrants (both in-movers and out-movers) and those who remained in SARP areas over the ten year period had no decreased or increased likelihood of unemployment when compared to residents living in comparator areas throughout the ten years. I argued that the reason for this may have been that the announcement of SARP funding in disadvantaged areas led to a 'bounce' in demand as people who might otherwise have left deferred moving in order to see how the initiative worked out (Baily and Livingstone 2008).

A similar finding was noted in regards to the morbidity outcomes in relation to the second thesis objective. The results of the modelling suggested that regeneration area migrants (both in-movers and out-movers) and those who remained in SARP areas over the ten year period had not decreased or increased likelihood of experiencing morbidity when compared to residents living in comparator

areas throughout the 10 years (for likelihood of LLTI) or 14 years (for likelihood of hospital admissions). The morbidity analysis did however observe some interesting evidence that those who moved out of SARP areas to-be and comparator areas at baseline were *more* likely than the reference category to be admitted to hospital. Of course, although this finding cannot be attributed to the SARP programme, it is surprising as previous literature has emphasised that it is healthier individuals who are more likely to migrate away from disadvantaged areas (Boyle 2004). It was concluded that the reasons for this finding may be that people with poor health were more likely to lose their jobs in the recession of the early 1990s and therefore may have moved away to cheaper accommodation. Alternatively, these individuals may have been re-housed within social housing to accommodate disability. For example, they may have moved to housing without stairs.

In relation to the second thesis objective, I can again conclude that the findings here do not indicate any differences in health and well-being outcomes between those who remained in SARP areas and those who moved out. Thus the findings do not support the assertion that those who move out of regeneration areas have done so because they have benefitted from the programme in a way that is statistically different from those who did not receive the programme.

Section 8.2.3 How was the programme practically implemented on the ground?

The third objective of the thesis was to understand how the SARP programme had been implemented in one area in an attempt to explore potential explanations for why no positive regeneration effect had been identified in the quantitative analyses. By investigating how the programme was practically implemented and how it impacted on the lives of residents, I aimed to shed light on potential limitations of the quantitative modelling in order to gain a fuller understanding of why no evidence of the programme having been successful was found on any of the outcomes. Two central findings were uncovered through this in-depth study. Firstly, in the area where the qualitative study was conducted, most of the major initiatives appeared to have been started during the SIP phase of the project. This therefore suggests that if similar delays occurred in other SARP areas then the time-lag that the SLS data provides to observe regeneration effects would be over-estimated, particularly in the case of the LLTI and unemployment outcomes whereby the data time period extends only to 2001. It is therefore feasible that any health impacts that could affect LLTI, such as housing renewal and environmental regeneration, may not be picked up by the modelling if similar delays had also occurred in other SARP areas. Similarly, the main employability initiative (pathfinders) was introduced following the transition to SIP, which again limits the ability of the data to pick up regeneration effects. This may therefore explain why no regeneration effect was

found in the modelling for these outcomes, although further work would be needed to test the hypothesis.

Secondly, the qualitative phase found that other smaller initiatives not funded by SARP money were taking place in the area under study in conjunction with the main programme. This could have had a confounding effect in the study where one particular funding stream was being evaluated and the modelling assumed both that all SARP areas were subject to the same funding stream and that comparator areas had no regeneration funding. This therefore highlights the difficulties of ascertaining details of all initiatives that may have taken place, especially if geographical areas are affected. For the quantitative analysis undertaken in this thesis great care was taken to ensure that the comparator areas were not subject to any regeneration work. However it is extremely difficult to completely rule out the possibility that small projects may have been undertaken in certain comparator areas.

Section 8.3 Advantages of the study

Evaluating area regeneration initiatives in a robust way to account for change in outcomes over time is a challenging process. In this thesis I have added to the previously limited evidence base concerning the effectiveness of the SARP programme in Scotland and in doing so have also contributed to the general literature concerned with developing ways to evaluate the impacts of area regeneration on health and well-being.

In this thesis I have argued that a more robust approach to evaluation is needed that uses longitudinal information about individuals' changing circumstances. In particular this approach was required in the case of the SARP programme as very little was known about its effectiveness prior to this evaluation. I improved upon the only previous evaluation of this programme (Tyler et al. 2001) by providing a measure of the counterfactual through the use of comparator areas with similar deprivation profiles to the SARP areas in order to provide an estimation of what would have happened in the absence of the initiative. Comparator areas were identified using propensity score matching and a series of models was fitted to examine whether health outcomes of residents and migrants differed between regeneration areas and comparator areas. The main advantage of the approach is that it replaces high-dimensional matches with single-index matches. Therefore the propensity score reduces the discrepancies observed in the characteristics of treatment and control groups, and thereby reduces the bias in estimation of the treatment effects with observational data like surveys, administrative records and census data. Propensity score matching has not been previously used in this context where health outcomes are being evaluated previously and its use

here therefore represents an original contribution to public policy evaluation literature and particularly the work of researchers working on evaluations of the health and well-being impacts of social interventions (e.g. Petticrew et al. 2005, Thomson et al. 2006, Atkinson et al. 2006, Kearns et al. 2009). The work also intersects on a wider level with the geography of health in that the social intervention being evaluated is an area-based programme. Thus this work (in particular the quantitative phase) can be seen to contribute to the branch of health geography in that focuses on geographies of disease and ill health (Ocana-Riola 2010). In a theoretical sense the work also intersects with the sociology of health and illness/wellness; a field which has helped to move beyond biomedical approaches to health and highlight the importance of the whole person, the importance of health (as well as disease and illness) and the importance of lay views (Nettleton 2006). This thesis therefore incorporates these tenets into the work by considering the impact of the SARP programmes on not only traditional health outcomes such as mortality LLTI and hospital admissions, but also investigates the impact of the programme on unemployment which is conceptualised as a determinant of health. In addition lay views were also sought in order to understand how the programme had impacted on the lives of residents.

Employing data from the SLS was key to tackling some of the key limitations of previous studies, For example, using this data meant that I did not have to rely on participants buying into the study through conducting a survey, which limited previous evaluations such as Huxley et al. (2003) and Thomson et al. (2007). Secondly, the data allowed me to follow resident's movements over time into and out of regeneration and comparator areas to account for the fact that neighbourhood populations are rarely static and to investigate whether or not the programme had a hand in facilitating migration out of the areas through improving health outcomes. This approach has not been undertaken previously in regards to the SARP programme and has rarely been used in studies of other area regeneration programmes. Indeed, previous studies of migration in area based initiatives have looked mainly at the flows to and from regeneration areas and not those to and from comparable non-intervention areas (Bailey and Livingstone 2008). The approach here therefore represents another original contribution to the literature outlined above.

Furthermore, previous evaluations have often not been able to account for programme effects beyond national or regional trends. Here I improve upon this by using the Difference in Differences (DiD) estimator which accounts for national trends in to identify whether the SARP programme has any net effects on decreasing the likelihood of unemployment for residents in regenerated areas between 1991 and 2001.

I therefore designed a robust evaluation making use of the best available data for the purpose of assessing the impacts of area regeneration on health by suing advanced quantitative techniques that have seldom been used in this context previously. However, in addition, I further enhanced the rigour of this study by conducting a qualitative study to explore residents' experiences of regeneration, carried out to provide insight into the results of the quasi-experiment. Indeed, as was observed in Chapter 2 conducting qualitative research alongside quasi-experimental work has been recommended (e.g. Stafford et al. 2008; Petticrew et al. 2005) in order to validate quantitative data and to identify the most effective aspects of intervention. In this case, as I have outlined above, the qualitative phase provided a particular advantage in that it allowed me to identify particular issues which enabled me to shed light on why no positive area regeneration effect was found in the quantitative analyses.

Section 8.4 Limitations of the study

Both phases of this research encountered certain problems that could be said to limit the ability of the study to shed light on the topic under investigation. In regards to the quantitative phase there are particular issues that should be highlighted. Firstly there are potential limitations within the selective migration modelling. For example, the group defined as 'remainers' within the selective migration modelling may have a heterogeneous element that is not picked up in the analysis. Any moves in between the two contact points of 1991 and 2001 that may have been due to regeneration processes (such as decanting or general selective migration out and back in to the area) will have been missed. However, the findings from Chapter 7 indicated that in the main, the policy of the SARP approach in the area studied was to permanently resettle large numbers of residents out with the area rather than bringing them back after a period when the new housing was built. This policy, which was carried out with the intention to minimise disruption to the lives of residents affected by large-scale housing renewal, therefore reflected well on the limitation of the quantitative modelling strategy outlined above. However, it is unclear how typical or atypical the decanting experience of the SARP programme in this particular area was and as a result this issue therefore remains a limiting factor of the modelling strategy.

A second limitation of the quantitative modelling is seen in the fact that mental health outcomes were not assessed. Past research (e.g. Mathers et al. 2008) has highlighted that residents subject to regeneration have had friendship networks disturbed to the detriment of their mental health. This is therefore a key area of research on the impact of area regeneration on health and well-being. As outlined in Chapter 3, extensive efforts were made to secure a means to assess the mental health impacts of the SARPs programme in the form of mental health (anxiolytics) prescriptions data for the

region of Fife at Output Area or Data zone levels of geography. However it was not possible to obtain this data at an appropriate level of geography resulting in the abandonment of the plan to assess mental health outcomes in SARP areas.

Further limitations can also be observed in the strategy of the qualitative phase of the research. For example, we know from previous work highlighted in this research that it is important to understand how area regeneration impacts on the residents who were originally intended to benefit from the process. Thus finding out how those who moved out of the regeneration area after the programme started is desirable. Whilst the quantitative phase was able to shed light on such resident movement, the qualitative phase was not able to recruit any residents who had been moved out of the area as part of the extensive housing renewal process. This was primarily due to the fact that a significant amount of time had passed since many residents had been decanted.

A further limitation of the qualitative phase was that the voices of some of the most socially excluded members of the community such as those with addictions to alcohol or drugs were not interviewed simply the due to the practical difficulties of accessing these individuals. Thus the study was unable to understand how the programme impacted on the most excluded groups in the community who were among those prioritised for help when the programme shifted to the Social Inclusion Partnership (SIP) phase in 1999.

Lastly, the qualitative phase was also limited in that it was essentially retrospective, focusing on a regeneration programme that had finished in 2006. Thus, there was a reliance on residents and regeneration professionals recalling accurate memories.

Section 8.5 Necessary future research to develop the understanding of the impact area regeneration has on health and well-being

Following on from this work, there are multiple avenues for necessary future research that can be pursued to build on the work presented here in order to understand the field of area regeneration and its impacts on health more comprehensively. Firstly, we have seen in this work that a crucial element to carrying out effective evaluations of area based regeneration initiatives is the time-lag that the data employed in the study can offer. Here I have been able employ time-lag data (up to eight years post-initiation of the programme) which offers longer periods of time to observe effects than many other evaluations have had. However, we have also seen earlier in this thesis that it may take ten or even twenty years to get a proper picture on the impacts of regeneration on health. Thus exploring routes to extend the time lag of the data used here is a topic that is necessary in order to develop a greater understanding of the impacts that the SARP programme had on health outcomes.

With that in mind, the Scottish Longitudinal Study will in the near future have data from the 2011 UK census integrated into its database, which would extend the time lag by a further ten years. This would therefore represent a longer time period to observe how SARP communities have fared over a much longer period of time than perhaps any previous evaluation has been able to employ. Pursuing this avenue of further research therefore represents a necessary and key way in which to combat the weaknesses of the currently available SLS data that was used in this study in order to generate a more comprehensive understanding of the impacts the SARP programme had on health outcomes.

Secondly, this thesis has also highlighted the importance of ascertaining the impact that area regeneration processes have on mental health outcomes. However this work has been unable to conduct work in this regard. Evaluating mental health outcomes associated with area based regeneration is necessary as area regeneration programmes have in the past been criticised for upsetting existing local friendship and community networks to the detriment of mental health (Gosling 2008). With that said, certain data are available that could be put to use in this regard. For example the Health Informatics Centre based at the University of Dundee hold prescription data for both Fife and Tayside in Scotland, which can be broken down to small area level. However, whilst in the case of Fife the data at present only extends back to 2009, the data for Tayside has been collected since the early 1990s. There is therefore potential to use this data resource once the Fife data matures in order to potentially conduct comparative work with Fife and Tayside on more recent area regeneration programmes. Conducting further research with these data would therefore allow an assessment of the impacts of area regeneration on mental health. This is an important area of research and one which is lacking in the present study and the wider literature generally on regeneration and health. This work would therefore represent a useful and necessary addition to the current literature in this field.

Thirdly, an embedded longitudinal qualitative study *during* a regeneration process can be seen as a necessary contribution to literature on area regeneration and its impacts on health. This approach would help researchers and policy makers to ascertain how views, attitudes and expectations change over time as residents experienced the processes of area regeneration. This would also aid the process of knowing how initiatives are impacting on the community as the programme is being carried out which would be very useful to inform decisions pertaining to what components of initiatives should be kept going and which should not. An embedded qualitative study such as this would therefore eliminate the weaknesses associated with the qualitative methods used in this study which relied on the individuals recruited to be interviewed for the qualitative phase recalling

memories of the SARP programme they experienced some years ago, which may be susceptible to inaccuracies.

Lastly, a further route for necessary future research could be to investigate the impact that health promotion strategies within area regeneration programmes are impacting on outcomes not investigated in this thesis such as obesity levels in disadvantaged areas. Obesity is of course a significant public health problem at present in Scotland and links between obesity and deprivation have been highlighted in previous research. For example, Gray et al. (2011) found that the incidence of obesity increases with deprivation and lower levels of education. Thus, health promoting initiatives to increase physical activity levels and improve the diets of residents have formed a key component of regeneration initiatives, as Chapter 7 of this thesis has shown. The impact of these initiatives can perhaps be studied by obtaining BMI data at area-level from GP surgeries which could therefore facilitate quantitative investigation of the impact of regeneration-related health promotion on obesity levels over time.

Section 8.6 Policy implications

Area-based regeneration is seen as a strategy for tackling the poor health and health inequalities that many of the most disadvantaged members of society experience simply by virtue of their socio-economic status and area of residence. However, it is currently unclear if these initiatives are succeeding. This study has added to the literature on the subject of area regeneration and its impacts on health and well-being by highlighting the difficulties of conducting robust evaluations and then carrying out a mixed method evaluation of the SARPs programmes. In this section I will reflect on the implications of these findings for the evaluation of public policy programmes.

In the UK public policy has in the last decade placed strong emphasis on measuring the impacts of policy and evaluating the evidence base for claims about the gains from current and prospective interventions (Petticrew et al. 2008). It is to this enterprise that this research contributes. The findings from the study demonstrated that the SARP programme has had no positive impact on unemployment (conceptualised here as a determinant of health), LLTI and hospital admissions, whilst in addition, a negative impact on longevity was observed compared to comparator area residents.

These results therefore do not reflect well on the ability of the SARP approach to improve the health of residents in disadvantaged areas. However it should be noted that the results do not signal the impact of the full duration of the programme which ended in 2006. Thus, as mentioned above it will

be important to employ the extended time lag SLS data when it becomes available in order to understand the full impact of the programme.

Firstly, an important implication of this work for the evaluation of area regeneration policies pertains to the finding from Chapter 7 that it took some time from when the area was originally designated a regeneration area to get the major regeneration initiatives under way. Thus it may be inappropriate for evaluations to be conducted, as they have done recently, with only eighteen months to two years of follow up data to note impacts. It is unsurprising therefore that those studies using such time frames often do not uncover any regeneration impacts.

Secondly, it is clear that the issue of overlapping initiatives in regeneration areas have implications that are problematic for measuring the impact of policies by making it difficult to isolate the impacts of the programme under study. It was evident from the qualitative research that those delivering the programme adopted an approach whereby it was felt that in order to boost the area renewal process the most was made of opportunities to source additional funding streams when they became available. Thus, when quasi-experimental evaluations are being carried out, particularly when the researcher has no control of the timing of the intervention it is crucial to conduct qualitative research alongside such quantitative work in order to ascertain whether other initiatives were operating in the area at the same time as the intervention of interest in order to provide the researcher with as full a picture as possible when drawing conclusions on the effectiveness of a programme.

However, whilst this thesis emphasises the usefulness of qualitative research to shed light on quantitative results in the likely event of the researcher having no control in the roll out of the programme, the experience of conducting this work suggests that ideally regeneration programmes should have a rigorous evaluation strategy embedded within the programme, which would be the first step towards finding out how regeneration efforts could be optimised to deliver on their potential for health and well-being improvement. Particularly useful would be the recruitment of a qualitative panel of residents to aid the evaluation process to avoid having to conduct retrospective qualitative analysis which relies on the memories of respondents. This should be arranged as part of policy development and not as an add-on once implementation has started or after the programme has finished. Thus, it is recommended that a longitudinal qualitative element be embedded into regeneration programmes in order to follow how residents experience the process over time to help to inform decisions of whether initiatives should be kept going or not. However, the implementation of qualitative research in this way may be costly at a time when public money is scarce. For example, it is possible that the results of such research may result in recommendations for more money to be

employed to overcome issues of issues such as poor diet or social exclusion. This is noted by Maginn (2007), who stated that under 'normal circumstances' the issues of cost in relation to applied ethnography are likely to prove problematic. However, nonetheless, work such as this would be extremely useful if conducted. In addition it has been noted by Petticrew et al. (2008) that the collection of quantitative data collection as part of the original SARPs evaluation was let down by the lack of appropriately trained researchers involved. Thus in addition to the recommendation regarding longitudinal work above I also recommend that quantitative data be collected via survey method during regeneration programmes by researchers trained in quantitative methods.

A further interesting implication of this work is observed in regards to continuity of strategy in area regeneration areas. Recently there has been much in the way of criticism aimed at those developing area regeneration policies for continually changing the focus of programmes. For example, a recent House of Commons Health Committee (2009) reported that the continual procession of area-based initiatives is quite disruptive as nothing is given time to bed in and function. This could be said to concisely encapsulate the experience of area regeneration in Scotland through the 1990s as the SARP programmes began with the RP and PPA initiatives and then changed to SIPs in 1999 following the election of New Labour. However, it should be noted that the evidence in Chapter 7 suggests that the rebranding of the SARPs in Parkhill actually had a bounce effect rather hinder the overall process as the change to SIPs seemed to usher in a new partnership that worked better for the area in the eyes of the practitioners interviewed. The implication of this would seem to be that rebranding can in some instances be a positive thing and can work if an initiative is failing from a partnership point of view or from the point of view of engaging residents.

However it was also clear that from this research that a lack of prior evidence to act as guidance on what may work for whom and under what circumstances was lacking to aid those implementing the programme. Thus regeneration practitioners were often undertaking initiatives informed more by guess work than evidence. This is therefore precisely why it is important that work such as this is carried out in order to establish a source of learning about the impacts that area regeneration has on residents' health and well-being.

Atkinson et al. (2006) described the cyclical rather than incremental way that urban policy is constructed in the UK; a result of government departments not collecting or storing relevant data or programme documentation. This approach, or lack of, is why relatively little was known about the impact of the SARP programmes on health and well-being outcomes. Thus, this study has gone some way to shedding light on these impacts. The main message of this study is therefore to ask for a more coherent and stable approach to area regeneration whereby evaluation is at the forefront of

the policy strategy in order to incrementally build an evidence base on the types of strategies that can work to improve the health and well-being of residents in disadvantaged areas of Scotland.

To conclude, this longitudinal mixed methods study has contributed to understanding how the SARP approach to area regeneration has impacted on the health and well-being of residents it by following individuals through time and conducting interviews with residents and regeneration professionals who experienced the programmes. In doing so the study has improved upon a deeply limited previous evaluation and added to the wider public policy evaluation literature which is currently scant in terms of evidence on the impacts of area regeneration on health and well-being. The study asked if area regeneration improves residents' health and well-being, and found no evidence to conclude that an improvement has taken place. However, unlike many past evaluations the study has been able to explore the reasons why this may have been at a detailed level through the qualitative phase and found that issues with partnerships can hold up the delivery of major programme initiatives, which may have (if similar problems took place in other areas) eroded some of the value of the time-lag given to observe regeneration effects that the SLS data provided. Thus in referring back to the thesis conceptual framework I can state that implementation problems that held up programme delivery may well have been the reason why no positive regeneration effect was noted in this thesis. It is therefore important that this study be extended when the 2011 census data is available in order to employ a lengthier time-lag that allows for further longitudinal analysis in order to support or refute the results of this study regarding the impact of the SARP programmes on residents' health and well-being.

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Appendices

Appendix 1.0 Approved Ethical Application – Quantitative Phase

Approval Code:	

University of St Andrews Teaching and Research ethics committee (utrec)

Please Tick: Staff ☐ Postgraduate ☒ Undergraduate ☐ (**Module Code**): ☐

double click on the box then click 'Checked' for a cross to appear in the box)

Researchers Name(s):	Daryll G Archibald		
Project Title:	Does Area Regeneration Improve Residents' Health and Well-being?		
School/Unit: (Please indicate)	Geography and Geosciences	Supervisor:	Professor Paul Boyle
Emails	dga5@st-andrews.ac.uk paul.boyle@st-andrews.ac.uk	Date Submitted	21/01/2010

APPLICATIONS MUST BE SUBMITTED ELECTRONICALLY TO THE SCHOOL ETHICS COMMITTEE SECRETARY. PLEASE SUBMIT DIRECTLY TO THE S.E.C CONVENOR ONLY IF THE S.E.C HAS NO APPOINTED SECRETARY – PLEASE REFER TO THE WEB LINK FOR INFORMATION, HTTP://WWW.ST-ANDREWS.AC.UK/UTREC/SEC/SCHOOLS/ PLEASE DO NOT SUBMIT DIRECTLY TO UTREC.

THE ETHICAL APPLICATIONS MUST CONTAIN ALL RELEVANT SUPPORTING DOCUMENTS, ADDED TO THE END OF THIS DOCUMENT. PLEASE INCLUDE THE RESEARCHER(S)' NAME IN THE EMAIL SUBJECT BOX E.G. 'SMITH-ETHICAL

Rationale: Please detail the project in 'lay language'. *This summary will be reviewed by UTREC and may be published as part of the reporting procedures. DO NOT exceed 75 Words (for database reasons).* Elucidation, if required can be given in Q.31

This research will explore the health and socio-economic effects of area regeneration on people's health and well-being in Scotland using the Scottish Longitudinal Study (SLS). We will compare outcomes for individuals who experienced regeneration between 1991 and 2001 with individuals living in similarly deprived areas throughout the same time period that did not. Thus, the aim is to shed light on long-term patterns of deprivation and their relationship to health and well-being.

Ethical Considerations: Please detail the main ethical considerations raised by the project, concentrating on any issues raised specifically in the red sections, and addressing, where appropriate, the issue of whether basic ethical criteria has been met in all supporting documentation and if not why not. *This summary will be reviewed by UTREC and may be published as part of its reporting procedures. DO NOT exceed 75 words (for database reasons).* Elucidation, if required can be given in Q.31

This project solely involves a secondary analysis of anonymised data obtained from the Scottish Longitudinal Study (SLS). With this in mind, the central ethical considerations of the study are issues of confidentiality. These related issues will be considered in Q.31

If ethical approval has been obtained from the University of St Andrews for research so similar to this project that a new review process may not be required, please give details of the application and the date of its approval.
Approval Code:
Date Approved:
Project Title:
Researchers Name(s):

RESEARCH INFORMATION

1. Estimated Start Date: 15/01/2010

2. Estimated Duration of Project: 8 months

3. Is this research funded by any external sponsor or agency? **YES** ☒ **NO** ☐

If YES please give details:
1. Economic and Social Research Council (CASE Award)
2. NHS Fife
3. Fife Council

For projects funded by ESRC please be aware of the Ethical and Legal Considerations found at http://www.esds.ac.uk/aandp/create/ethical.asp

4. Does this research entail collaborative with other researchers? **YES** ☒ **NO** ☐

If YES state names and institutions of collaborators:
1. Paul Boyle, Department Head, School of Geography and Geosciences
2. Zhiqiang Feng, School of Geography and Geosciences

5. If the research is collaborative has a framework been devised to ensure That all participants are given appropriate recognition in any outputs? **N/A** ☒ **YES** ☐ **NO** ☐

6. Where projects raise ethical considerations to do with roles in research, intellectual property, publication strategies/authorship, responsibilities to funders, research with policy or other implications etc., have you taken appropriate steps to address these issues? **N/A** ☒ **YES** ☐ **NO** ☐

RESEARCH INFORMATION

7. Location of Research Fieldwork to be conducted:	

8. Is this research solely concerned with
   a. Published secondary data sources? **YES** ☐ **NO** ☐
   b. Unpublished data but with appropriate permissions, e.g. an archive curator? **YES** ☒ **NO** ☐

9. a. Who are the intended Participants (e.g. students aged 18-21) and how will your recruit them (e.g. advertisement)	
b. Estimated duration of Participant Involvement.	

If you have answered YES to Q8a or Q8b but the project has other Ethical Considerations please go to Q12, Q30 and Q31. If there are no other Ethical Considerations please sign and submit.

ETHICAL CHECKLIST

10. Have you obtained permission to access the site of research? **N/A** ☒ **YES** ☐ **NO** ☐

If YES please state agency/authority etc. and provide documentation. If NO please indicate why	

11. Where appropriate has ethical approval been sought and obtained from any external body e.g. NRES/LEC or other UK Universities? If YES, please attach a copy of the external application and approval. **N/A** ☒ **YES** ☐ **NO** ☐

12. Will you tell participants that their participation is voluntary? **YES** ☐ **NO** ☐

13. Will you describe the main project/experimental procedures to participants in advance so that they can make an informed decision about whether or not to participate? **YES** ☐ **NO** ☐

14. Will you tell participants that they may withdraw from the research at any time and for any reason, without having to give an explanation? **YES** ☐ **NO** ☐

15. Please answer either a. or b.
   a. Will you obtain written consent from participants? **YES** ☐ **NO** ☐
   b. *(Social Anthropology Geography/Geosciences* and *Biology ONLY)* Will you obtain written consent from participants, in those cases where it is appropriate **YES** ☐ **NO** ☐

16. Please answer either a. or b.
    a. If the research is photographed or videoed or taped or observational, will you ask participants for their consent to being Photographed, videoed, taped or observed? **N/A** ☐ **YES** ☐ **NO** ☐
    b. *(Social Anthropology* and *Biology ONLY)* Will participants be free to reject the use of intrusive research Methods such as audio-visual recorders and photography? **N/A** ☒ **YES** ☐ **NO** ☐

17. Will you tell participants that their data will be treated with full confidentiality and that if published, it will not be identifiable as theirs? **YES** ☐ **NO** ☐

18. Will participants be clearly informed of how the data will be stored, who will have access to it, and when the data will be destroyed? **YES** ☐ **NO** ☐

19. Will you debrief participants at the end of their participation, i.e. give them a brief explanation in writing of the study? **YES** ☐ **NO** ☐

20. With questionnaires and/or interviews, will you give participants the option of omitting questions they do not want to answer? **N/A** ☒ **YES** ☐ **NO** ☐

If you have answered NO to any question 11- 20, please give a brief explanation in the statement of Ethical Considerations on Page 1 and expand in Q31 if necessary. If you have answered YES, it must be clearly illustrated in the relevant paperwork which must be attached i.e. Participants Information Sheet, Consent Form, Debriefing Form, Questionnaire, Letters etc……

WORKING WITH CHILDREN / VULNERABLE PEOPLE

Do participants fall into any of the following special groups? If they do, please tick the appropriate answer, refer to the relevant guidelines and complete Q31. Please see http://www.st-andrews.ac.uk/utrec/children/

21. a. Children (under 18 years of age) **YES** ☐ **NO** ☒
    b. People with learning or communication difficulties **YES** ☐ **NO** ☒
    c. Patients (including carers of NHS patients) **YES** ☐ **NO** ☒
    d. People in custody **YES** ☐ **NO** ☒
    e. Institutionalised persons **YES** ☐ **NO** ☒
    f. People engaged in illegal activities e.g. drug-taking **YES** ☐ **NO** ☒
    g. Other vulnerable groups **YES** ☐ **NO** ☒

If you have answered YES to Q 21 you must obtain Enhanced Disclosure Scotland Approval. Furthermore, you may need to obtain permission from the local Education Authority, Police, LREC (NHS) clearance

22. If working with children, institutionalised person(s) or vulnerable people, do you have:

    1. Enhanced Disclosure Scotland Certificate? **YES** ☐ **NO** ☐

    2. If you have been in the UK for less than a year, equivalent Documentation from the countries you have resided in? Information on what is required can be obtained from UTREC **N/A** ☒ **YES** ☐ **NO** ☐

If YES a copy (or copies) must be submitted with this application to be retained by the School. If NO please explain in Q31.

23. If working with children or vulnerable people, have you constructed appropriate letters to i.e. parents, children, head teachers, carers, institutions, police etc. **YES** ☐ **NO** ☐

RISK AND SAFETY

This section is for ethical use only and does not replace the University official procedures on Risk and Safety measures. In addition to completing this section you must review the following http://www.st-andrews.ac.uk/utrec/riskassessment/ and http://www.st-andrews.ac.uk/staff/policy/Healthandsafety/Publications/Fieldwork/ and follow the relevant procedures.

24. Are any of the participants in a dependant relationship with the investigator e.g. lecturer/student? If YES, give explanation in Q31. **YES** ☐ **NO** ☒

25. Will your project involve deliberately misleading participants in any way? If YES, give details in Q31 and state why it is necessary and explain how debriefing will occur **YES** ☐ **NO** ☒

26. Is there any significant risk to any paid or unpaid participant(s), field assistant(s), helper(s) or student(s), involved in the project, experiencing either physical or psychological distress or discomfort? If Yes, give details in Q31 and state what you will do if they should experience any problems e.g. who to contact for help. **YES** ☐ **NO** ☒

27. Is there any significant risk to the investigator? **YES** ☐ **NO** ☒

    If YES, please indicate if the appropriate risk assessment forms have been submitted to the appropriate Safety Committee(s)?

28. *(Bute Medical School and Biology only)* Have appropriate chemical, Radiation and biological (including GMAG) risk assessments been Submitted to the appropriate Safety Committee for approval? **N/A** ☒ **YES** ☐ **NO** ☐

30. Do you think the processes, including any results, of your research have the potential to cause any damage, harm or other problems for People in your study area? If YES, please explain in Q31 and indicate how you will seek to obviate the effects **YES** ☐ **NO** ☒

There is an obligation on the Lead Researcher and Supervisor to bring to the attention of the School Ethics Committee (SEC) any issues with ethical implications not clearly covered by the above checklist.

ETHICAL STATEMENT

31. Write a clear but concise statement of the ethical considerations raised by the project and how you intend to deal with them. It may be that in order to do this you need to expand on the Ethical Considerations section on page 1. (continue on additional pages if necessary)

The Ethical Considerations section on page 1 is elucidated here.

According to the ESRC Research Ethics Framework, potential harm to participants represents risk, which researchers should endeavour to determine and manage prior to the start of a project (ESRC Research Ethics Framework 2005). With this in mind, this study will involve the analysis of anonymous data obtained from the Scottish Longitudinal Study (SLS), which is a large scale study created from the linkage of Census data (beginning 1991), vital events data (births, deaths, marriages), National Health Service Central Service Register (NHSCSR) data (migration in or out of Scotland) and NHS data (cancer registrations and hospital discharges) (Hattersley and Boyle 2007). As these data hold a range of sensitive personal information about individuals, it is essential that people's privacy is protected and that confidentiality is maintained to eliminate any potential harm to those included in the study.

With this in mind the SLS is a completely anonymous dataset, which instead of having a process of informed consent, has strict confidentiality procedures in place for any research that uses it. These procedures take the form of four key measures that have been approved by the Multi-Centre Research Ethics Committee for Scotland (MREC). According to Hattersley and Boyle (2007) these procedures include:

i. Strictly controlling the dataset itself. The SLS is based on individual-level data for a sample of twenty birth dates known only by the small group of researchers who maintain the dataset.
ii. Strictly controlling the environment in which the data are managed. The data are held in a secure network of the SLS which is physically in the buildings of GRO(S).
iii. The creation, maintenance and use of the SLS being overseen by a Steering Committee. Every proposed project is considered by the SLS research board which grants permission for studies to be undertaken. No projects are approved that may compromise the anonymity of individuals.
iv. Access to the data being strictly controlled once a project has been agreed. The data is not publicly available, instead a subset of the data is created for each project, from which the researcher can choose from two strategies to do analyses. One is to use remote access to allow the researcher to send syntax (SPSS,SAS,STATA) which is run on their behalf. The results are checked to make sure that the outputs contain no identifiable information. Alternatively the researcher can visit a safe setting within GRO(S) to work on the data alongside a member of the SLS support team. Again only non-disclosive results can be taken from the safe setting.

These steps ensure that this research will maintain the anonymity of subjects, which in turn ensures that potential for harm to individuals is avoided.

References

Hattersley, L. and Boyle, P. (2007) *The Scottish Longitudinal Study: an introduction.* LSCS Working Paper 1.0. Edinburgh/St-Andrews: Longitudinal Studies Centre Scotland. Accessed online at: http://www.lscs.ac.uk/sls/publications.htm
ESRC Research Ethics Framework (2005) Accessed online at:
http://www.esrc.ac.uk/ESRCInfoCentre/opportunities/research_ethics_framework/index.aspx

DOCUMENTATION CHECKLIST				
Ethical Application Form	**YES**	☒	**NO**	☐
Participant Information Sheet	**YES**	☐	**NO**	☒
Consent Form	**YES**	☐	**NO**	☒
Debriefing Form	**YES**	☐	**NO**	☒
External Permissions	**YES**	☒	**NO**	☐
Letters to Parents / Children / Head Teachers etc…..	**YES**	☐	**NO**	☒
Enhanced Disclosure Scotland and or Equivalent (as necessary)	**YES**	☐	**NO**	☒
Advertisement	**YES**	☐	**NO**	☒
Other (please list):				

DECLARATION
I am familiar with the UTREC Guidelines for Ethical Research http://www.st-andrews.ac.uk/utrec/guidelines/ and *BPS, *ESRC, *MRC and *ASA (*please delete the guidelines not appropriate to your discipline) Guidelines for Research practices, and have discussed them with other researchers involved in the project.

STUDENTS ONLY

My Supervisor has seen and agreed all relevant paperwork linked to this project **YES** ☐ **NO** ☐

Print Name:	
Signature	
Date:	

SUPERVISOR(S)

The Supervisor must ensure they have read both the application and the guidelines, and also has approved the project and application, before signing below, with clear regard for the balance between risk and the value of the research to the School/Student. (Supervisors should provide this on a separate sheet or supply to the student to insert below) Please, if you wish, add comments in no more than 200 words:

Print Name:	
Signature	
Date:	

STAFF MEMBER **YES** ☐ **NO** ☐

Print Name:	
Signature	
Date:	

SCHOOL ETHICS COMMITTEE OFFICIAL USE ONLY

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed University Procedures and has been:

☐ Approved ☐ Not Approved pending:

☐ More Clarification Required

☐ New Submission Recommended

☐ Discussed with Supervisor

☐ Referred to UTREC

☐ Referred to Fieldwork Subcommittee

Convenor's Name	
Signature	
Date:	

Please use the space below and additional pages to attach any supporting documents i.e. Participant Information Sheets, Consent Forms, Debriefing Forms, Questionnaires, Letter to Parents etc.

We recommend you refer to the sample documents provided at

Appendix 1.1 Approved Ethical Application – Qualitative Phase

Approval Code:

University of St Andrews

Teaching and Research ethics committee (utrec)

Please Tick: (*click on the box then click 'Checked' for a cross to appear in the box)*

Undergraduate ☐ Postgraduate Research ☒ Postgraduate Taught ☐ Staff ☐

Lecturer/Course Controller on behalf of Taught module ☐ Module Code:

Researchers Name(s):	Daryll G Archibald		
Project Title:	Does Area Regeneration Improve Residents' Health and Well-being?		
School/Unit: (Please indicate)	Geography and Geosciences	Supervisor:	Dr. Elspeth Graham
Emails: dga5@st-andrews.ac.uk efg@st-andrews.ac.uk		Date Submitted	14/4/11

APPLICATIONS MUST BE SUBMITTED ELECTRONICALLY TO THE SCHOOL ETHICS COMMITTEE SECRETARY/CONVENOR.

PLEASE SUBMIT DIRECTLY TO THE S.E.C CONVENOR ONLY IF THE S.E.C HAS NO APPOINTED SECRETARY.

HTTPS://WWW.ST-ANDREWS.AC.UK/UTREC/SEC/SECMEMBERS/ **PLEASE DO NOT SUBMIT DIRECTLY TO UTREC**

Rationale: Please detail the project in 'lay language'. *This summary will be reviewed by UTREC and may be published as part of the reporting procedures. DO NOT exceed 75 Words (for database reasons).* Elucidation, if required can be given in Q.29

This project will use semi-structured interviews to collect primary data from residents living in regeneration areas in Fife, Scotland. As part of a wider mixed methods PhD project investigating the effects of area regeneration on health and well-being, this qualitative study aims to shed light on the views, emotions and experiences of residents who have been subject to regeneration practices in order to investigate how the process has impacted on their self-rated health.

Ethical Considerations: Please detail the main ethical considerations raised by the project, concentrating on any issues raised specifically in the red sections, and addressing, where appropriate, the issue of whether basic ethical criteria has been met in all supporting documentation and if not why not. *This summary will be reviewed by UTREC and may be published as part of its reporting procedures. DO NOT exceed 75 words (for database reasons).* Elucidation, if required can be given in Q.29

The sample will be drawn from residents in Fife's Social Inclusion Partnership Areas and does not involve accessing members of vulnerable groups. Those selected to take part will be recruited with help from Fife Council Locality Managers who will identify potential suitable participants for the researcher to approach. The main ethical considerations that are raised therefore are informed consent, potential harm to participants, confidentiality, and data protection.

If ethical approval has been obtained from the University of St Andrews for research so similar to this project that a new review process may not be required, please give details of the application and the date of its approval.
Approval Code:
Date Approved:
Project Title:
Researchers Name(s):

RESEARCH INFORMATION

1. Estimated Start Date: 01/6/11

2. Estimated Duration of Project: 4 months

3. Is this research funded by any external sponsor or agency? **YES** ☒ **NO** ☐

If YES please give details: Economic and Social Research Council (CASE Award)

For projects funded by ESRC please be aware of the Ethical and Legal Considerations found at http://www.esds.ac.uk/aandp/create/ethical.asp

4. Does this research entail collaboration with other researchers? **YES** ☒ **NO** ☐

If YES state names and institutions of collaborators:

1. Dr. Elspeth Graham, School of Geography and Geosciences, University of St-Andrews
2. Dr. Zhiqiang Feng, School of Geography and Geosciences,

5. If the research is collaborative has a framework been devised to ensure that all collaborators are given appropriate recognition in any **N/A** ☐ **YES** ☒ **NO** ☐

RESEARCH INFORMATION

6. Where projects raise ethical considerations to do with roles in research, intellectual property, publication strategies/authorship, responsibilities to funders, research with policy or other implications etc., have you taken appropriate steps to address these issues?

N/A ☐ YES ☒ NO ☐

7. Location of Research Fieldwork to be conducted:

Social Inclusion Partnership Areas in Fife. These are Abbeyview, Benarty, Buckhaven, Linktown, Lochgelly, Sinclairtown, Templehall

8. Are you using only library, internet sources or unpublished data *(with appropriate licenses and permissions)* and so have no human involvement such as interviewing of people?

YES ☐ NO ☒

9. a. Who are the intended Participants (e.g. students aged 18-21) and how will your recruit them (e.g. advertisement)

Individuals aged 18-75 living in regeneration areas in Fife.

b. Estimated duration of Participant Involvement.

Participant involvement will take the form of one semi-structured interview per participant lasting approximately one hour

If you have answered YES to Q8 but the project has other Ethical Considerations please go to Q.29. If there are no other Ethical Considerations please sign and submit.

ETHICAL CHECKLIST

10. Have you obtained permission to access the site of research?

N/A ☒ YES ☐ NO ☐

If YES please state agency/authority etc. and provide documentation.
If NO please indicate why in Q.29

11. Will inducement i.e. other than expenses, be offered to participants?
If YES, please give details of the inducement being offered and justify

YES ☐ NO ☒

12. Has ethical approval been sought and obtained from any external body e.g. REC(NHS)/LEA and or including other UK Universities? If YES, please attach a copy of the external application and approval.

N/A ☐ YES ☐ NO ☒

13. Will you tell participants that their participation is voluntary?

YES ☒ NO ☐

14. Will you describe the main project/experimental procedures to participants in advance so that they can make an informed decision about whether or not to participate?

YES ☒ NO ☐

15. Will you tell participants that they may withdraw from the research at any time and for any reason, without having to give an explanation? **YES** ☒ **NO** ☐

16. Please answer either a. or b.
    a. Will you obtain written consent from participants? **YES** ☐ **NO** ☐
    b. *(ONLY: Social Anthropology, Geography/Geoscience, International Relations* and *Biology)*
    Will you obtain written consent from participants, in those cases where it is appropriate? **YES** ☒ **NO** ☐

17. Please answer either a. or b.
    a. If the research is photographed or videoed or taped or observational, will you ask participants for their consent to being Photographed, videoed, taped or observed? **N/A** ☐ **YES** ☒ **NO** ☐
    b. *(Social Anthropology* and *Biology ONLY)*
    Will participants be free to reject the use of intrusive research Methods such as audio-visual recorders and photography? **N/A** ☐ **YES** ☐ **NO** ☐

18. Please answer either a. or b.
    a. Will you tell participants that their data will be treated with full confidentiality and that if published, it will not be identifiable as theirs?
    b. Will you tell participants their work /contribution will be credited unless they specifically request anonymity? **YES** ☒ **NO** ☐

19. Will participants be clearly informed of how the data will be stored, who will have access to it. and when the data will be destroved? **YES** ☒ **NO** ☐

20. Will you give participants a brief explanation in writing of the study? i.e. a debrief **YES** ☒ **NO** ☐

21. With questionnaires and/or interviews, will you give participants the option of omitting questions they do not want to answer? **N/A** ☐ **YES** ☒ **NO** ☐

If you have answered NO to any question 12- 21, please give a brief explanation in the statement of Ethical Considerations on Page 1 and expand in Q29 if necessary.
If you have answered YES, it must be clearly illustrated in the relevant paperwork which must be attached i.e. Participants Information Sheet, Consent Form, Debriefing Form, Questionnaire, Letters etc……

WORKING WITH CHILDREN AND OR VULNERABLE PEOPLE

Do participants fall into any of the following special groups? If they do, please tick the appropriate answer, refer to and follow the guidelines details at www.st-andrews.ac.uk/utrec/EthicalApplication/children/ and complete Q.29.

22. a. Children (under 18 years of age) **YES** ☐ **NO** ☒
    b. People with learning or communication difficulties **YES** ☐ **NO** ☒
    c. Patients (including carers of NHS patients) **YES** ☐ **NO** ☒
    d. People in custody **YES** ☐ **NO** ☒

e. Institutionalised persons — YES ☐ NO ☒

f. People engaged in illegal activities e.g. drug-taking — YES ☐ NO ☒

g. Other vulnerable groups — YES ☐ NO ☒

If you have answered YES to Q.22 you must obtain Enhanced Disclosure Scotland Approval. Furthermore, you may need to obtain permission from the Local Education Authority, Police, REC (NHS)

23. If working with children, institutionalised person(s) or vulnerable people, do you have:

2. Enhanced Disclosure Scotland Certificate? — YES ☐ NO ☐

2. If you have been in the UK for less than a year, equivalent Documentation from the countries you have resided in? Information on what is required can be obtained from UTREC — N/A ☒ YES ☐ NO ☐

If YES a copy (or copies) must be submitted with this application to be retained by the School. If NO please explain in Q.29.

24. If working with children or vulnerable people, have you constructed appropriate letters to i.e. parents, children, head teachers, carers, institutions, police etc. — YES ☐ NO ☐

ETHICAL RISK

This section is for ethical use only and does not replace the University official procedures on Risk and Safety measures. In addition to completing this section you must review the following https://www.st-andrews.ac.uk/utrec/EthicalApplication/riskassessment/ and http://www.st-andrews.ac.uk/staff/policy/Healthandsafety/Publications/Fieldwork/ and follow the relevant procedures.

25. Are any of the participants in a dependant relationship with the investigator e.g. lecturer/student? If YES, give explanation in Q.29. — YES ☐ NO ☒

26. Will your project involve deliberately misleading participants in any way? If YES, give details in Q.29 and state why it is necessary and explain how debriefing will occur — YES ☐ NO ☒

27. Is there any significant risk to any paid or unpaid participant(s), field assistant(s), helper(s) or student(s), involved in the project, experiencing either physical or psychological distress or discomfort? If Yes, give details in Q.29 and state what you will do if they should experience any problems e.g. who to contact for help. — YES ☐ NO ☒

28. Do you think the processes, including any results, of your research have the potential to cause any damage, harm or other problems for people in your study area? If YES, please explain in Q.29 and indicate how you will seek to obviate the effects. — YES ☐ NO ☒

There is an obligation on the Lead Researcher and Supervisor to bring to the attention of the School Ethics Committee (SEC) any issues with ethical implications not clearly covered by the above

ETHICAL STATEMENT

29. Write a clear but concise statement of the ethical considerations raised by the project and how you intend to deal with them. It may be that in order to do this you need to expand on the Ethical Considerations section on page 1. (continue on additional pages if necessary)

his study is a qualitative investigation into how individuals resident in Fife's regeneration areas experience the regeneration process in relation to their health and well-being. With this in mind, the following deals with and elucidates on questions 10-28 which have been ticked 'yes'.

Q.4 The research will entail collaboration with my supervisors, Elspeth Graham (lead supervisor) and Zhiqiang Feng (secondary supervisor). This collaboration will involve the supervisors commenting and offering constructive criticism of the work as the project progresses.

Q.5 In any outputs from this research both Elspeth Graham and Zhiqiang Feng will be given appropriate recognition as second (Gaham) and third (Feng) authors.

Q.6

i. Publication strategies/authorship: As stated above, the supervisors of this study will be appropriately credited in an future publications
ii. Responsibilities to Funders: The Economic and Social Research Council fund this research and will be appropriately credited in any research outputs.
iii. Research with Policy or Other Implications: This research is investigating the health impacts of area regeneration initiatives which are, in effect government anti-deprivation policy. The researcher has an agreement in place to present the results of the research to Communities Analytical Services at the Scottish Government in their seminar series.

Q.10. The site of the research is the homes of individuals resident in Social Inclusion Partnership Areas in Fife. It is recognized that interviewing residents in their own homes presents possible risk to the safety of the researcher. With these in mind, the researcher will carry a mobile phone at all times and have a contact individual who knows where and when all interviews are taking place. In addition the researcher will use discretion when selecting respondents to ensure that only individuals who are perceived as 'safe' to work with are interviewed.

Q.13. An information sheet on the study will be given to all prospective participants. On this document participants will be told that their participation is voluntary and that they can withdraw at any time without having to give a reason.

Q.14. Procedures involved in the study will be explained in the information sheet.

Q.15. Participants will be made aware they can withdraw at any time without having to give an explanation. This information will be included on the 'coded data consent form'.

Q.16b. Written consent will be obtained from participants using the 'coded data consent form'

Q.17a. All interviews will be taped using a digital dictaphone, thus all participants will be asked if they consent to this. Participants will indicate whether they consent or not via the 'coded data consent form'.

Q.18a. Participants will be told on the information sheet that their data will be treated with full confidentiality and that if published the data will not be identifiable as theirs.Q.19. Participants. Participants will be informed via the information sheet that the data will be stored on a password protected computer accessible only to the researcher.

Q.20. A debriefing form will be issued following the interviews that will cater specifically for participants who have experienced any unpleasant or distressing emotions and memories by participating in the study. This form will contain details of what participants can do to find support (such as counseling services, G.P. etc) for any issues they have related to their health and well-being.

Q.21. The information sheet will inform participants that they can omit questions they do not wish to answer.

Q.27. It is possible that participants may experience some degree of upset or distress during the course of an interview, which may be the result of negative experiences associated with area regeneration. For example, certain past research has highlighted that residents subject to regeneration have had friendship networks disturbed to the detriment of their mental health. With this in mind, the information sheet makes it clear to participants that an interview can be stopped at any time should any unpleasant memories or emotions be triggered by the interview.

DOCUMENTATION CHECKLIST				
Ethical Application Form	YES	☒	NO	☐
Participant Information Sheet	YES	☒	NO	☐
Consent Form	YES	☒	NO	☐
Debriefing Form	YES	☐	NO	☒
External Permissions	YES	☐	NO	☒
Letters to Parents / Children / Head Teachers etc…..	YES	☐	NO	☒
Enhanced Disclosure Scotland and or Equivalent (as necessary)	YES	☐	NO	☒
Advertisement	YES	☐	NO	☒
Other (please list):				

DECLARATION

I am familiar with the UTREC Guidelines for Ethical Research http://www.st-andrews.ac.uk/utrec/guidelines/ and *BPS, *ESRC, *MRC and *ASA (*please delete the guidelines not appropriate to your discipline) Guidelines for Research practices, and have discussed them with other researchers involved in the project.

STUDENTS ONLY

My Supervisor has seen and agreed all relevant paperwork linked to this project **YES** ☒ **NO** ☐

Print Name:	DARYLL ARCHIBALD
Signature	
Date:	1st May 2011

SUPERVISOR(S)

The Supervisor must ensure they have read both the application and the guidelines, and also has approved the project and application, before signing below, with clear regard for the balance between risk and the value of the research to the School/Student. (Supervisors should provide this on a separate sheet or supply to the student to insert below) Please, if you wish, add comments in no more than 200 words:

I fully approve this research and have read the application, which covers the major ethical issues associated with this project.

Print Name:	Dr Elspeth Graham
Signature	
Date:	13 April 2011

STAFF RESEARCHER ONLY **YES** ☐ **NO** ☐

Print Name:	
Signature	
Date:	

SCHOOL ETHICS COMMITTEE OFFICIAL USE ONLY

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed University Procedures and has been:

☐ Approved ☐ Not Approved pending:

☐ More Clarification Required

☐ New Submission Recommended

☐ Discussed with Supervisor

☐ Referred to UTREC

☐ Referred to Fieldwork Subcommittee

Convenor's Name	
Signature	

Please use the space below and additional pages to attach any supporting documents i.e. Participant Information Sheets, Consent Forms, Debriefing Forms, Questionnaires, Letter to Parents etc.

We recommend you refer to the sample documents provided at

University of St Andrews

PARTICIPANT CONSENT FORM

Coded Data

Project Title
Does Area Regeneration Improve Residents' Health and Well-being?

Researcher(s) Name(s)
Daryll G Archibald
PhD Candidate
Room 601
School of Geography and Geosciences
Irvine Building, North Street
University of St-Andrews
Tel.01334 463949

Supervisors Names
Lead Supervisor:

Dr Elspeth Graham
Reader in Geography
School of Geography and Geosciences
University of St Andrews
Tel.: 01334 463908

Secondary Supervisor:

Dr. Zhiqiang Feng
Longitudinal Studies Centre for Scotland(LSCS)
School of Geography and Geosciences

University of St Andrews
Tel.: 01334 463951

The University of St Andrews attaches high priority to the ethical conduct of research. We therefore ask you to consider the following points before signing this form. Your signature confirms that you are happy to participate in the study.

What is Coded Data?
The term 'Coded Data' refers to when data collected by the researcher is identifiable as belonging to a particular participant but is kept with personal identifiers removed. The researcher(s) retain a 'key' to the coded data which allows individual participants to be re-connected with their data at a later date. The un-coded data is kept confidential to the researcher(s) (and Supervisors). If consent it given to archive data (see consent section of form) the participant may be contacted in the future by the original researcher(s) or other researcher(s).

Consent
The purpose of this form is to ensure that you are willing to take part in this study and to let you understand what it entails. Signing this form does not commit you to anything you do not wish to do and you are free to withdraw at any stage.

Material gathered during this research will be coded and kept confidentially by the researcher with only the researcher and supervisor having access. It will be securely stored on a password protected computer that only the researcher will have access to. When the project is completed in December 2011 the data will be destroyed.

Please answer each statement concerning the collection and use of the research data.

I have read and understood the information sheet.	☐ Yes	☐ No
I have been given the opportunity to ask questions about the study.	☐ Yes	☐ No
I have had my questions answered satisfactorily.	☐ Yes	☐ No
I understand that I can withdraw from the study at any time without having to give an explanation.	☐ Yes	☐ No
I understand that my data will be confidential and that it will contain identifiable personal data but that will be stored with personal identifiers removed by the researcher and that only the researcher/supervisor will be able to decode this information as and when necessary.	☐ Yes	☐ No
I understand that my data will be stored until the project is completed (approx 1 year) before being destroyed	☐ Yes	☐ No
I have been made fully aware of the potential risks associated with this research and am satisfied with the information provided.	☐ Yes	☐ No
I agree to take part in the study	☐ Yes	☐ No

Part of my research involves taking tape recordings. These recordings will be kept secure and stored with no identifying factors i.e. consent forms and questionnaires.

Photographs and recorded data can be valuable resources for future studies therefore we ask for your additional consent to maintain data and images for this purpose.

I agree to being tape recorded	☐ Yes	☐ No
I agree for tape recorded material to be published as part of this research	☐ Yes	☐ No

Participation in this research is completely voluntary and your consent is required before you can participate in this research. If you decide at a later date that data should be destroyed we will honour your request in writing.

Name in Block Capitals _____

Signature _____

Date _____

University of St Andrews

PARTICIPANT INFORMATION SHEET

Project Title

Does Area Regeneration Improve Residents' Health and Well-being?

What is the study about?

I invite you to participate in a research project about how area regeneration (which attempts to improve local neighbourhoods) impacts on the health and well-being of residents in Fife. To do this I am looking for volunteers who are keen to discuss and identify their experiences of living in an area that has undergone (or is undergoing) a process of regeneration.

This study is being conducted as part of my (Daryll Archibald) PhD Thesis in the School of Geography and Geosciences at the University of St-Andrews.

Do I have to take part?

This information sheet has been written to help you decide if you would like to take part. It is up to you and you alone whether or not to take part. If you do decide to take part you will be free to withdraw at any time without providing a reason.

What would I be required to do?

If you agree to participate, you will take part in one face-to-face interview with me that will last for around 60 minutes, during which you will be asked a few questions relating to your experiences of living in a regeneration area, and have the opportunity to tell me about how improvements in your neighbourhood have affected your health and well-being. You should bear in mind that that the questions in the interview will concern your own health and well-being and as such it is possible that at points in the interview you may recall unpleasant times in your life when for example you may have been ill or suffered from stress. However, should you feel upset at any point during the interview you can stop it without having to give a reason for doing so.

Will my participation be anonymous and confidential?

Confidentiality and anonymity will be preserved for all participants as all data will be anonymised and participants' names will be replaced with a pseudonym and participant number. With your consent, I would like to tape record the interview so that I don't miss any details. Later I will write out what was said but I will not attach your name to the written record.

Storage of data collected

The data collected will be accessible by the researcher involved in this study only and will be stored on a password protected computer.

What will happen to the results of the research study?

The data will be used in the researcher's PhD thesis but may be used at seminars, presentations and in published journal articles. However, no names or location details will be included in publications or presentations. Where direct quotations are used in publications all names will be changed and no identification of individuals will be possible.

Questions

You will have the opportunity to ask any questions in relation to this project before giving completing a Consent Form.

Consent and Approval

This research proposal has been scrutinised and been granted Ethical Approval through the University of St-Andrews ethical approval process.

What should I do if I have concerns about this study?

A full outline of the procedures governed by the University Teaching and Research Ethical Committee is available at://www.st-andrews.ac.uk/utrec/complaints/

Contact Details

Researcher: Daryll G Archibald

Contact Details: Room 601

School of Geography and Geosciences

Irvine Building, North Street

University of Andrews

Tel.01334 463949

Email.dga5@st-andrews.ac.uk

Supervisor: Dr Elspeth Graham

Contact Details: Tel. 01334 463908

Email.efg@st-andrews.ac.uk

University of St Andrews

PARTICIPANT DEBRIEFING FORM

Project Title
Does Area Regeneration Improve Residents' Health and *Well-being?*

Researcher(s) Name(s)
Daryll G Archibald
PhD Candidate
Room 601
School of Geography and Geosciences
Irvine Building, North Street
University of St-Andrews
Tel.01334 463949

Supervisor's Name
Lead Supervisor:

Dr Elspeth Graham
Reader in Geography
School of Geography and Geosciences
University of St Andrews
Tel.: 01334 463908

Nature of Project
This postgraduate research project was conducted to investigate how area regeneration programmes impact on the health and well-being of residents in Fife. Area regeneration attempts to improve both the appearance of local neighbourhoods and also the health and opportunities of people living in the area. However, to date very little is actually known about how effective these programmes are in improving health and well-being. With this study I have sought to interview residents to discuss and identify their experiences of living in an area that has undergone (or is undergoing) a process of regeneration

Storage of Data
Your data will remain accessible to only the researcher and will be stored on a password protected computer.

Help Organisations

If you have been affected by participation in this study and wish to discuss your concerns further you may wish to contact your GP or Victoria Hospital (01592 643355) for advice on how to access counselling services. Alternatively, you can access online counselling services at: http://www.talktoacounsellor.co.uk/.

What should I do if I have concerns about this study?

A full outline of the procedures governed by the University Teaching and Research Ethical Committee are outline on their website://www.st-andrews.ac.uk/utrec/complaints/

Contact Details

Researcher: Daryll G Archibald

Contact Details: Room 601

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Irvine Building, North Street

University of Andrews

Tel.01334 463949

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Supervisor: Dr Elspeth Graham
Contact Details: Tel. 01334 463908

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Appendix 2.0 Ethical Approval Letter – Quantitative Phase

University of St Andrews

University Teaching and Research Ethics Committee

05/03/2010
Daryll Archibald
Geography and Geosciences

Ethics Reference No: *Please quote this ref on all correspondence*	**GG6203**
Project Title:	Does Area Regeneration Improve Residents' Health and Well-being?
Researchers Name(s):	**Daryll Archibald**
Supervisor(s):	**Prof. Paul Boyle**

Thank you for submitting your application which was considered at the <name> School Ethics Committee meeting on the <*date*>. The following documents were reviewed:

1. Ethical Application Form 21/01/2010

The University Teaching and Research Ethics Committee (UTREC) approves this study from an ethical point of view. Please note that where approval is given by a School Ethics Committee that committee is part of UTREC and is delegated to act for UTREC.

Approval is given for three years. Projects, which have not commenced within two years of original approval, must be re-submitted to your School Ethics Committee.

You must inform your School Ethics Committee when the research has been completed. If you are unable to complete your research within the 3 three year validation period, you will be required to write to your School Ethics Committee and to UTREC (where approval was given by UTREC) to request an extension or you will need to re-apply.

Any serious adverse events or significant change which occurs in connection with this study and/or which may alter its ethical consideration, must be reported immediately to the School Ethics Committee, and an Ethical Amendment Form submitted where appropriate.

Approval is given on the understanding that the 'Guidelines for Ethical Research Practice' (http://www.st- andrews.ac.uk/media/UTRECguidelines%20Feb%2008.pdf) are adhered to.

Yours Sincerely,

Convenor of the School Ethics Committee or Convener of UTREC
Ccs Supervisor School of Ethics Committee

Tel: 01334 462866 The University of St Andrews is a
charity registered in Scotland: No SC013532

Appendix 2.1 Ethical Approval Letter – Qualitative Phase

University of St Andrews

University Teaching and Research Ethics Committee

School Of Geography And Geosciences

24 May 2011
Daryll G Archibald
Geography and Geosciences

ETHICS REFERENCE NO: *PLEASE QUOTE THIS REF ON ALL CORRESPONDENCE*	**GG7554**
Project Title:	Does Area Regeneration Improve Residents' Health and Well-being?
Researchers Name(s):	Daryll Archibald
Supervisor(s):	Elspeth Graham

Thank you for submitting your application which was considered by the Geography and Geosciences School Ethics Committee. The following documents were reviewed:

1. Ethical Application Form 18 May 2011
2. Participant Information Sheet 18 May 2011
3. Participant Consent Form 18 May 2011
4. Participant Debriefing Form 18 May 2011

The University Teaching and Research Ethics Committee (UTREC) approves this study from an ethical point of view. Please note that where approval is given by a School Ethics Committee that committee is part of UTREC and is delegated to act for UTREC.

Approval is given for three years. Projects, which have not commenced within two years of original approval, must be re-submitted to your School Ethics Committee.

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Approval is given on the understanding that the 'Guidelines for Ethical Research Practice' (http://www.st-andrews.ac.uk/media/UTRECguidelines%20Feb%2008.pdf) are adhered to.

Yours sincerely

Dr. Sharon Leahy

Convenor of the School Ethics Committee

UTREC School of Geography and Geosciences Convenor, Irvine Building, North Street, St Andrews, KY16 9AL
Email: ggethics@st-andrews.ac.uk Tel: 01334 463897

Appendix 3.0 Participant Information Sheet and Coded Data Consent

PARTICIPANT INFORMATION SHEET

Project Title
Does Area Regeneration Improve Residents' Health and Well-being?

What is the study about?
I invite you to participate in a research project about how area regeneration (which attempts to improve local neighbourhoods) impacts on the health and well-being of residents in Fife. To do this I am looking for volunteers who are keen to discuss and identify their experiences of living in an area that has undergone (or is undergoing) a process of regeneration.

This study is being conducted as part of my (Daryll Archibald) PhD Thesis in the School of Geography and Geosciences at the University of St-Andrews.

Do I have to take part?

This information sheet has been written to help you decide if you would like to take part. It is up to you and you alone whether or not to take part. If you do decide to take part you will be free to withdraw at any time without providing a reason.

What would I be required to do?

If you agree to participate, you will take part in one face-to-face interview with me that will last for around 60 minutes, during which you will be asked a few questions relating to your experiences of living in a regeneration area, and have the opportunity to tell me about how improvements in your neighbourhood have affected your health and well-being. You should bear in mind that that the questions in the interview will concern your own health and well-being and as such it is possible that at points in the interview you may recall unpleasant times in your life when for example you may have been ill or suffered from stress. However, should you feel upset at any point during the interview you can stop it without having to give a reason for doing so.

Will my participation be anonymous and confidential?
Confidentiality and anonymity will be preserved for all participants as all data will be anonymised and participants' names will be replaced with a pseudonym and participant number. With your consent, I would like to tape record the interview so that I don't miss any details. Later I will write out what was said but I will not attach your name to the written record.

Storage of data collected

The data collected will be accessible by the researcher involved in this study only and will be stored on a password protected computer.

What will happen to the results of the research study?

The data will be used in the researcher's PhD thesis but may be used at seminars, presentations and in published journal articles. However, no names or location details will be included in publications or presentations. Where direct quotations are used in publications all names will be changed and no identification of individuals will be possible.

Questions

You will have the opportunity to ask any questions in relation to this project before giving completing a Consent Form.

Consent and Approval

This research proposal has been scrutinised and been granted Ethical Approval through the University of St-Andrews ethical approval process.

What should I do if I have concerns about this study?

A full outline of the procedures governed by the University Teaching and Research Ethical Committee is available at://www.st-andrews.ac.uk/utrec/complaints/

Contact Details

Researcher: Daryll G Archibald

Contact Details: Room 601

School of Geography and Geosciences

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University of Andrews

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Supervisor: Dr Elspeth Graham

Contact Details: Tel. 01334 463908

Email.efg@st-andrews.ac.uk

University of St Andrews

PARTICIPANT CONSENT FORM

Coded Data

Project Title
Does Area Regeneration Improve Residents' Health and Well-being?

Researcher(s) Name(s)
Daryll G Archibald
PhD Candidate
Room 601
School of Geography and Geosciences
Irvine Building, North Street
University of St-Andrews
Tel.01334 463949

Supervisors Names
Lead Supervisor:

Dr Elspeth Graham
Reader in Geography
School of Geography and Geosciences
University of St Andrews
Tel.: 01334 463908

Secondary Supervisor:

Dr. Zhiqiang Feng
Longitudinal Studies Centre for Scotland(LSCS)
School of Geography and Geosciences

University of St Andrews
Tel.: 01334 463951

The University of St Andrews attaches high priority to the ethical conduct of research. We therefore ask you to consider the following points before signing this form. Your signature confirms that you are happy to participate in the study.

What is Coded Data?
The term 'Coded Data' refers to when data collected by the researcher is identifiable as belonging to a particular participant but is kept with personal identifiers removed. The researcher(s) retain a 'key' to

the coded data which allows individual participants to be re-connected with their data at a later date. The un-coded data is kept confidential to the researcher(s) (and Supervisors). If consent it given to archive data (see consent section of form) the participant may be contacted in the future by the original researcher(s) or other researcher(s).

Consent

The purpose of this form is to ensure that you are willing to take part in this study and to let you understand what it entails. Signing this form does not commit you to anything you do not wish to do and you are free to withdraw at any stage.

Material gathered during this research will be coded and kept confidentially by the researcher with only the researcher and supervisor having access. It will be securely stored on a password protected computer that only the researcher will have access to. When the project is completed in December 2011 the data will be destroyed.

Please answer each statement concerning the collection and use of the research data.

I have read and understood the information sheet.	☐ Yes	☐ No
I have been given the opportunity to ask questions about the study.	☐ Yes	☐ No
I have had my questions answered satisfactorily.	☐ Yes	☐ No
I understand that I can withdraw from the study at any time without having to give an explanation.	☐ Yes	☐ No
I understand that my data will be confidential and that it will contain identifiable personal data but that will be stored with personal identifiers removed by the researcher and that only the researcher/supervisor will be able to decode this information as and when necessary.	☐ Yes	☐ No
I understand that my data will be stored until the project is completed (approx 1 year) before being destroyed	☐ Yes	☐ No
I have been made fully aware of the potential risks associated with this research and am satisfied with the information provided.	☐ Yes	☐ No
I agree to take part in the study	☐ Yes	☐ No

Part of my research involves taking tape recordings. These recordings will be kept secure and stored with no identifying factors i.e. consent forms and questionnaires.

Photographs and recorded data can be valuable resources for future studies therefore we ask for your additional consent to maintain data and images for this purpose.

I agree to being tape recorded	☐ Yes	☐ No
I agree for tape recorded material to be published as part of this research	☐ Yes	☐ No

Participation in this research is completely voluntary and your consent is required before you can participate in this research. If you decide at a later date that data should be destroyed we will honour your request in writing.

Name in Block Capitals

Signature

Date

Appendix 3.1 Participant Debriefing Form

PARTICIPANT DEBRIEFING FORM

Project Title
Does Area Regeneration Improve Residents' Health and *Well-being?*

Researcher(s) Name(s)
Daryll G Archibald
PhD Candidate
Room 601
School of Geography and Geosciences
Irvine Building, North Street
University of St-Andrews
Tel.01334 463949

Supervisor's Name
Lead Supervisor:

Dr Elspeth Graham
Reader in Geography
School of Geography and Geosciences
University of St Andrews
Tel.: 01334 463908

Nature of Project
This postgraduate research project was conducted to investigate how area regeneration programmes impact on the health and well-being of residents in Fife. Area regeneration attempts to improve both the appearance of local neighbourhoods and also the health and opportunities of people living in the area. However, to date very little is actually known about how effective these programmes are in improving health and well-being. With this study I have sought to interview residents to discuss and identify their experiences of living in an area that has undergone (or is undergoing) a process of regeneration

Storage of Data
Your data will remain accessible to only the researcher and will be stored on a password protected computer.

Help Organisations

If you have been affected by participation in this study and wish to discuss your concerns further you may wish to contact your GP or Victoria Hospital (01592 643355) for advice on how to access counselling services. Alternatively, you can access online counselling services at: http://www.talktoacounsellor.co.uk/.

What should I do if I have concerns about this study?

A full outline of the procedures governed by the University Teaching and Research Ethical Committee are outline on their website://www.st-andrews.ac.uk/utrec/complaints/

Contact Details

Researcher: Daryll G Archibald

Contact Details: Room 601

School of Geography and Geosciences

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University of Andrews

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Supervisor: Dr Elspeth Graham
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Appendix 4.0 Qualitative Aide Memoire – Key Informant

Qualitative 'Key Informant' Interviews
Aide Memoire

1. What is your current job?

2. Did you work in the XXXX area of XXXX 1995-2005?

3. What was your job? What did this job entail?

4. Can you recall the SARP area regeneration programme? What are your views on the SARP programme?

5. What was the area like in the mid 1990s?

6. Can you describe the process of accessing funds for the SARP programme? Was this a straightforward task?

7. What work were you directly involved in as part of the SARP? Probe for examples of physical, social and economic regeneration projects.

8. Were local residents subject to decanting processes as part of the SARP regeneration? What was the policy on decanting? E.g. were residents moved only within the area?

9. What in your view were the main successes of the SARPs regeneration programme in this area?

10. What aspects of the SARPs regeneration do you feel were less successful? Were there any challenges along the way when trying to regenerate this area as part of SARPs?

11. Was resident health and well-being an explicit concern of those involved in implementing the SARPs regeneration programme? / Was there an effort to improve resident's health and well-being as part of the regeneration process?

12. Was the SARPs programme in this area subject to any process of evaluation?

13. What do you think area regeneration can achieve for residents living in disadvantaged areas?

Appendix 4.1 Qualitative Aide Memoire – Residents

Qualitative Resident Interviews
Aide Memoire

1. How long have you and/or your family lived here? When did you move in?

2. Are you originally from the XXXX area, pre-1991? If no, probe moving history.

3. Can you recall what the area was like in the mid 1990s? Use prompt examples of events/circumstances at that time to jog memory if necessary (Where were you living/working at that time?)

4. What was the area like at that time? Try to cover the following:
   - Crime
   - Vandalism
   - Physical appearance of the area, housing, parks etc
   - Employment opportunities

5. Area Change: Has the area has changed for you since the mid 1990s? If so in what ways? Try to cover the following
   - Crime
   - Vandalism
   - Physical appearance of the area, housing, parks etc
   - Employment opportunities

6. Personal Change: How has your own life changed since the mid-1990s? Try to cover:
   - Employment
   - Health

7. How is your health in general? / Over the last twelve months how would you say your health has been on the whole?

8. What would make you happy in this area?

9. What do you think people here need to lead healthy lives?

10. Have you been aware of any improvement in the area over the last 15 years or so?

11. What is it like living in the area now? (best/worst things)

Appendix 5.0 Variables included in propensity score matching process

Variables Used for Propensity Score Matching

Variable 1: males seeking work as a proportion of economically active.
Variable 2: proportion of married females in private households in full time work
Variable 3: student 16 over as a proportion of persons in private households
Variable 4: cars per total private households
Variable 5: children aged 0-4 per married female in private households
Variable 6: proportion residents born in the new commonwealth or Pakistan
Variable 7: proportion of persons in private household aged 0-4
Variable 8: aged 5-15
Variable 9: aged 16-24
Variable 10: aged 25-44
Variable 11: aged 45-64
Variable 12: aged 65+
Variable 13: proportion of persons in private households over 16 and married
Variable 14: proportion of single non-pensioner households
Variable 15: persons per household
Variable 16: rooms per household

Variable 17: household owner occupied
Variable 18: rented from local authority or new town
Variable 19: rented from a housing association
Variable 20: over 1.5 persons per room
Variable 21: shared dwelling
Variable 22: no bath
Variable 23: workers travelling to work by foot
Variable 24: renting private furnished
Variable 25: renting private unfurnished
Variable 26: Taking public transport to work
Variable 27: manufacturing workers
Variable 28: agricultural workers
Variable 29: workers in distribution, catering, transportation and other services
Variable 30: Seven or more rooms
Variable 31: One or two rooms
Variable 32: social class i
Variable 33: social class ii
Variable 34: social class iii

Variable 35: social class iv
Variable 36: social class v
Variable 37: lone pensioner resident
Variable 38: single parent family
Variable 39: Age 16 and over and permanently sick or disabled

Appendix 5.1 Propensity score matching balance test results

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pstest v* popden
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Variable	Sample	Mean Treated	Mean Control	%bias	%reduct |bias|	t-test t	t-test p>|t|
v1	Unmatched	2660	1018.6	156.4		59.69	0.000
	Matched	2115.1	2163.5	-4.6	97.0	-1.01	0.314
v2	Unmatched	1607.6	645.5	121.7		49.95	0.000
	Matched	1215.5	1203.5	1.5	98.8	0.34	0.733
v3	Unmatched	265.47	441.9	-63.8		-19.00	0.000
	Matched	285.21	276.85	3.0	95.3	0.73	0.467
v4	Unmatched	525.14	2015.5	-137.9		-35.85	0.000
	Matched	666.98	627.68	3.6	97.4	1.68	0.093
v5	Unmatched	7808.5	5221.8	84.0		33.36	0.000
	Matched	6762.2	6691.1	2.3	97.3	0.46	0.649
v6	Unmatched	50.27	94.6	-29.7		-8.35	0.000
	Matched	59.452	57.569	1.3	95.8	0.30	0.768
v7	Unmatched	1435.3	1327	20.7		7.17	0.000
	Matched	1331.3	1305.8	4.9	76.5	0.94	0.348
v8	Unmatched	1373	1246.9	31.2		10.19	0.000
	Matched	1340.6	1343.5	-0.7	97.7	-0.13	0.893
v9	Unmatched	2761.1	2895.7	-20.3		-6.32	0.000
	Matched	2776.2	2763.5	1.9	90.5	0.37	0.711
v10	Unmatched	2173.3	2331.8	-25.5		-8.38	0.000
	Matched	2227.1	2243.3	-2.6	89.8	-0.52	0.606
v11	Unmatched	1510.6	1605.4	-10.4		-3.42	0.001
	Matched	1660.4	1691.8	-3.4	66.9	-0.63	0.527
v12	Unmatched	3996.1	4831.5	-109.4		-35.24	0.000
	Matched	4229.4	4203.8	3.3	96.9	0.69	0.490
v13	Unmatched	1532.1	1173.4	40.7		13.58	0.000
	Matched	1401.3	1423.7	-2.5	93.8	-0.49	0.625
v14	Unmatched	23961	24775	-19.0		-6.42	0.000
	Matched	23789	23592	4.6	75.7	0.90	0.370
v15	Unmatched	39094	47614	-112.9		-32.22	0.000
	Matched	39896	39594	4.0	96.5	1.05	0.292
v16	Unmatched	2458.3	5767.1	-134.2		-40.71	0.000
	Matched	3193.3	3152.2	1.7	98.8	0.37	0.712
v17	Unmatched	7179.3	3178.3	144.3		44.32	0.000
	Matched	6371.5	6426	-2.0	98.6	-0.42	0.678

v18	Unmatched	264.06	663.92	-49.3		-14.39	0.000
	Matched	340.39	339.56	0.1	99.8	0.02	0.982
v19	Unmatched	649.09	291.42	99.4		38.29	0.000
	Matched	535.96	531.03	1.4	98.6	0.28	0.777
v20	Unmatched	4.5033	21.179	-25.3		-6.47	0.000
	Matched	4.5563	2.9336	2.5	90.3	1.90	0.057
v21	Unmatched	17.577	38.509	-20.5		-5.81	0.000
	Matched	21.082	17.135	3.9	81.1	1.00	0.316
v22	Unmatched	1695.1	1367.7	21.9		7.34	0.000
	Matched	1636.1	1599.2	2.5	88.7	0.52	0.605
v23	Unmatched	3596.5	1695.5	96.0		34.40	0.000
	Matched	3145.6	3202.8	-2.9	97.0	-0.57	0.568
v24	Unmatched	2286.3	1691.9	38.8		13.07	0.000
	Matched	2292.5	2220.8	4.7	87.9	0.91	0.363
v25	Unmatched	36.692	592.44	-55.9		-14.17	0.000
	Matched	44.122	31.158	1.3	97.7	1.16	0.246
v26	Unmatched	6416.2	6544.6	-6.8		-2.19	0.029
	Matched	6406.1	6493	-4.6	32.3	-0.97	0.332
v27	Unmatched	166.99	679.55	-56.4		-15.17	0.000
	Matched	229.49	205.37	2.7	95.3	0.79	0.429
v28	Unmatched	1309.2	2931.2	-86.8		-25.16	0.000
	Matched	1531.8	1502.9	1.5	98.2	0.38	0.707
v29	Unmatched	1125.6	1252.6	-9.5		-3.07	0.002
	Matched	1216.4	1253.5	-2.8	70.8	-0.56	0.572
v30	Unmatched	3067.4	2571.3	25.3		8.26	0.000
	Matched	3203	3245.3	-2.2	91.5	-0.43	0.664
v31	Unmatched	2031.5	1532	30.1		9.74	0.000
	Matched	1978.9	1965.4	0.8	97.3	0.16	0.873
v32	Unmatched	1163.9	560.53	48.1		17.90	0.000
	Matched	1020.5	981.81	3.1	93.6	0.61	0.541
v33	Unmatched	2324.6	1829.3	46.9		15.83	0.000
	Matched	2375.7	2442.3	-6.3	86.5	-1.19	0.235
v34	Unmatched	950.38	327.18	112.5		47.35	0.000
	Matched	716.55	707.37	1.7	98.5	0.34	0.735
v35	Unmatched	1844.6	1155.8	102.2		35.13	0.000
	Matched	1735.8	1788.1	-7.8	92.4	-1.50	0.135
v36	Unmatched	1843.6	1226.5	90.5		30.17	0.000
	Matched	1775.6	1834.6	-8.6	90.5	-1.63	0.103
v37	Unmatched	5058.4	3987.6	39.5		12.76	0.000

```
                 Matched | 4943.1   5019.4     -2.8    92.9 |  -0.52  0.602
                         |                                  |
      v38    Unmatched | 5636.1   4987.6     61.3         |  19.69  0.000
                 Matched | 5428.6   5454.2     -2.4    96.0 |  -0.49  0.624
                         |                                  |
   popden    Unmatched | 9078.8   5342.9     55.7         |  18.90  0.000
                 Matched | 8939.8   8926.7      0.2    99.6 |   0.04  0.968
                         |                                  |
-------------------------------------------------------------------------------
```

Appendix 6.0 Unemployment Sensitivity Analysis (with 'never worked' category removed from social class variable)

1. Cross Sectional 1991

Logistic regression — Number of obs = 18208
LR chi2(26) = 1618.19
Prob > chi2 = 0.0000
Log likelihood = -5585.7545 — Pseudo R2 = 0.1265

employment9	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreatmen~1	1.006657	.0510988	0.13	0.896	.9113265	1.111961
_Itreatmen~2	(omitted)					
age9	.9957279	.0025308	-1.68	0.092	.99078	1.000701
age92	1.000183	.0001704	1.07	0.284	.9998488	1.000517
_Isexten9_2	.5066926	.0299823	-11.49	0.000	.451208	.5690001
_Imstatus9_2	.7135813	.0677155	-3.56	0.000	.5924728	.8594458
_Imstatus9_3	1.097888	.1090494	0.94	0.347	.9036725	1.333843
_Imstatus9_4	.5098301	.1144807	-3.00	0.003	.3283151	.7916988
_Isclass9_2	1.515297	.4336418	1.45	0.146	.8647773	2.655164
_Isclass9_3	1.540825	.4481145	1.49	0.137	.8713657	2.724622
_Isclass9_4	2.198999	.6335729	2.73	0.006	1.250195	3.867873
_Isclass9_5	2.550221	.7356878	3.25	0.001	1.448849	4.488823
_Isclass9_6	2.600035	.7622585	3.26	0.001	1.463627	4.618788
_Iqual9_2	.6463411	.1139635	-2.48	0.013	.4574851	.9131592
_Iqual9_3	.7474552	.1373933	-1.58	0.113	.5213409	1.071639
_Iqual9_4	1.376559	.1808502	2.43	0.015	1.064058	1.780838
_Iethnicit~2	2.419903	.6493791	3.29	0.001	1.43014	4.094654
_Ihtenure9_2	2.459862	.1538317	14.39	0.000	2.176103	2.780623
_Ihtenure9_3	2.323288	.2746586	7.13	0.000	1.842783	2.929085
centralhea~9	1.060427	.0585749	1.06	0.288	.951619	1.181677
_Ihouseper~1	.7169524	.0602961	-3.96	0.000	.6080003	.8454284
_Icars9_1	.4563888	.0259348	-13.80	0.000	.408286	.5101588
_Icars9_2	.3323853	.0357949	-10.23	0.000	.269138	.4104956
_Icars9_3	.3324832	.0738488	-4.96	0.000	.2151329	.5138455
_Imhuposit~2	1.183051	.1162781	1.71	0.087	.9757567	1.434383
_Imhuposit~3	1.107627	.1684173	0.67	0.501	.8221785	1.492178
_Imhuposit~4	1.10862	.0885761	1.29	0.197	.947924	1.296557

2. Cross Sectional 2001

Logistic regression — Number of obs = 11852; LR chi2(28) = 1169.41; Prob > chi2 = 0.0000; Log likelihood = -2417.1781; Pseudo R2 = 0.1948

employment0	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreatmen~1	.9687741	.0780204	-0.39	0.694	.8273149	1.134421
_Itreatmen~2	(omitted)					
age0	.9940865	.0046635	-1.26	0.206	.9849882	1.003269
age02	1.00047	.0003084	1.52	0.127	.9998658	1.001075
_Isexten0_2	.4578503	.0436638	-8.19	0.000	.379793	.5519503
_Imstatus0_2	.7453724	.090065	-2.43	0.015	.5881941	.9445521
_Imstatus0_3	.8272369	.1085619	-1.45	0.148	.6396214	1.069884
_Imstatus0_4	.6398744	.1913544	-1.49	0.135	.3560761	1.149864
_Isclass0_2	1.551137	.5504874	1.24	0.216	.7736866	3.109822
_Isclass0_3	2.493899	.894966	2.55	0.011	1.234284	5.038983
_Isclass0_4	2.84444	1.013398	2.93	0.003	1.414934	5.718173
_Isclass0_5	3.262395	1.16474	3.31	0.001	1.620469	6.567988
_Isclass0_6	3.124131	1.149864	3.10	0.002	1.518578	6.427195
_Iqual0_2	.8472135	.1473054	-0.95	0.340	.6025514	1.191219
_Iqual0_3	.6427036	.1014631	-2.80	0.005	.4716635	.8757682
_Iqual0_4	1.225352	.3075866	0.81	0.418	.7491924	2.004143
_Iethnicit~2	2.390591	.6166889	3.38	0.001	1.441867	3.963561
_Ihtenure0_2	3.626939	.3352481	13.94	0.000	3.025947	4.347296
_Ihtenure0_3	3.984706	.5699876	9.66	0.000	3.01049	5.274186
centralhea~0	1.375582	.1801114	2.44	0.015	1.064227	1.778026
_Ihouseper~1	.7301468	.093209	-2.46	0.014	.5685224	.9377192
_Icars0_1	3.005123	2.251918	1.47	0.142	.6918405	13.05324
_Icars0_2	1.562893	1.171601	0.60	0.551	.3596147	6.792363
_Icars0_3	1.213628	.9200819	0.26	0.798	.2746428	5.36294
_Imhuposit~2	1.452283	.2240737	2.42	0.016	1.073294	1.965096
_Imhuposit~3	2.108226	.3861312	4.07	0.000	1.472366	3.018691
_Imhuposit~4	1.250113	.1585905	1.76	0.078	.9749112	1.603

3. Selective Migration 1991

```
Logistic regression                               Number of obs   =      14040
                                                  LR chi2(30)     =    1150.99
                                                  Prob > chi2     =     0.0000
Log likelihood = -3986.4748                       Pseudo R2       =     0.1262

------------------------------------------------------------------------------
 employment9 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Itreateds~2 |    .820061   .2021031    -0.80   0.421     .5059045    1.329302
_Itreateds~3 |   1.018086   .1029585     0.18   0.859     .8350315    1.241269
_Itreateds~4 |   1.511848   .3760607     1.66   0.097     .9284917    2.461716
_Itreateds~5 |   1.012847   .0802197     0.16   0.872     .8672147    1.182935
_Itreateds~6 |   .9750999   .0921224    -0.27   0.790     .8102742    1.173454
_Itreateds~7 |  (omitted)
_Itreateds~8 |  (omitted)
_Itreateds~9 |  (omitted)
        age9 |   .9993565   .0032245    -0.20   0.842     .9930565    1.005696
       age92 |   1.001145   .0002311     4.96   0.000     1.000692    1.001598
 _Isexten9_2 |   .5315832   .0371677    -9.04   0.000     .4635069    .6096581
_Imstatus9_2 |   .7640579    .087295    -2.36   0.019      .610766    .9558233
_Imstatus9_3 |   1.234561   .1449518     1.79   0.073     .9807799    1.554009
_Imstatus9_4 |   .6530984   .1754828    -1.59   0.113     .3857154    1.105835
 _Isclass9_2 |   1.325742   .4701846     0.80   0.427     .6615667     2.65671
 _Isclass9_3 |   1.407809   .5060546     0.95   0.341     .6959346    2.847861
 _Isclass9_4 |    2.08336    .742345     2.06   0.039     1.036247    4.188566
 _Isclass9_5 |   2.344738   .8368924     2.39   0.017     1.164878    4.719633
 _Isclass9_6 |   2.315847   .8398887     2.32   0.021     1.137639    4.714279
   _Iqual9_2 |   .6558322   .1363468    -2.03   0.042     .4363438    .9857269
   _Iqual9_3 |   .6808414   .1619021    -1.62   0.106     .4272013    1.085074
   _Iqual9_4 |   1.445743   .2228262     2.39   0.017     1.068807    1.955614
_Iethnicit~2 |   2.827209   1.070307     2.75   0.006     1.346218    5.937455
_Ihtenure9_2 |   2.405277   .1761977    11.98   0.000     2.083583     2.77664
_Ihtenure9_3 |   1.995786   .2990974     4.61   0.000     1.487815    2.677188
centralhea~9 |   1.067784   .0709069     0.99   0.323     .9374728    1.216208
_Ihouseper~1 |   .6961257   .0704767    -3.58   0.000     .5708353    .8489155
   _Icars9_1 |   .4509855   .0304999   -11.77   0.000     .3949993     .514907
   _Icars9_2 |   .3255406   .0411063    -8.89   0.000     .2541693     .416953
   _Icars9_3 |    .398446   .0939516    -3.90   0.000     .2509923    .6325263
_Imhuposit~2 |   1.231034   .1456321     1.76   0.079     .9762753    1.552272
_Imhuposit~3 |   1.180687   .2078797     0.94   0.345     .8361164    1.667259
_Imhuposit~4 |    1.1469   .1083064     1.45   0.147       .95311    1.380092
------------------------------------------------------------------------------
```

4. Selective Migration 2001

Logistic regression — Number of obs = 9392; LR chi2(32) = 703.31; Prob > chi2 = 0.0000; Log likelihood = -1714.7772; Pseudo R2 = 0.1702

employment0	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreateds~2	.8653721	.3240375	-0.39	0.699	.4154048	1.802745
_Itreateds~3	(omitted)					
_Itreateds~4	1.037494	.4184558	0.09	0.927	.470617	2.287196
_Itreateds~5	.9621407	.1204234	-0.31	0.758	.7528363	1.229636
_Itreateds~6	(omitted)					
_Itreateds~7	.9755824	.1611316	-0.15	0.881	.7057902	1.348504
_Itreateds~8	.8555576	.1304027	-1.02	0.306	.6346152	1.153421
_Itreateds~9	(omitted)					
age0	.9968499	.007582	-0.41	0.678	.9820996	1.011822
age02	1.000033	.0004891	0.07	0.946	.9990753	1.000992
_Isexten0_2	.4457135	.0520507	-6.92	0.000	.3545292	.5603502
_Imstatus0_2	.7402605	.1129908	-1.97	0.049	.5488581	.9984102
_Imstatus0_3	.7963169	.1278453	-1.42	0.156	.5813386	1.090794
_Imstatus0_4	.718807	.2502547	-0.95	0.343	.3632989	1.4222
_Isclass0_2	1.20186	.5053672	0.44	0.662	.5271499	2.740145
_Isclass0_3	1.811464	.7773703	1.38	0.166	.78117	4.200623
_Isclass0_4	2.219278	.9410506	1.88	0.060	.9666578	5.095075
_Isclass0_5	2.217335	.9454911	1.87	0.062	.9613282	5.114358
_Isclass0_6	2.063517	.9098048	1.64	0.100	.8695876	4.896693
_Iqual0_2	1.012813	.2051203	0.06	0.950	.6809874	1.506326
_Iqual0_3	.769469	.1507433	-1.34	0.181	.5241264	1.129656
_Iqual0_4	.9828203	.3053661	-0.06	0.956	.5345674	1.806949
_Iethnicit~2	3.099975	1.374598	2.55	0.011	1.299919	7.392648
_Ihtenure0_2	3.68813	.3997472	12.04	0.000	2.982268	4.561061
_Ihtenure0_3	4.465958	.8773136	7.62	0.000	3.03879	6.563396
centralhea~0	1.704588	.2660112	3.42	0.001	1.255406	2.314486
_Ihouseper~1	.8078916	.1328647	-1.30	0.195	.5852828	1.115168
_Icars0_1	2.117209	1.630845	0.97	0.330	.4678423	9.581375
_Icars0_2	1.14554	.8823781	0.18	0.860	.2531355	5.18403
_Icars0_3	.8775118	.6856521	-0.17	0.867	.1897399	4.058329
_Imhuposit~2	1.308469	.2580526	1.36	0.173	.8889795	1.925906
_Imhuposit~3	1.601376	.3690296	2.04	0.041	1.019384	2.515641
_Imhuposit~4	1.142028	.168788	0.90	0.369	.8548146	1.525744

5. Difference in Difference

```
Conditional fixed-effects logistic regression   Number of obs      =      1056
Group variable: slsno                           Number of groups   =       528

                                                Obs per group: min =         2
                                                               avg =       2.0
                                                               max =         2

                                                LR chi2(19)        =     81.29
Log likelihood  = -325.33742                    Prob > chi2        =    0.0000
```

employment	OR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Iinter01_1	.9661524	.1965712	-0.17	0.866	.6484285	1.439558
dummyvar	.7050398	.1231875	-2.00	0.045	.5005969	.9929769
treatment	1.722704	.7884307	1.19	0.235	.7024911	4.22455
_Imstatus_2	.4030889	.1654137	-2.21	0.027	.1803422	.9009576
_Imstatus_3	.6591576	.3188946	-0.86	0.389	.2553792	1.701347
_Imstatus_4	4.385779	5.239818	1.24	0.216	.4217853	45.6039
_Iqual_2	.7488082	.2872978	-0.75	0.451	.3530101	1.588378
_Iqual_3	.877999	.3628638	-0.31	0.753	.3905757	1.973708
_Iqual_4	.6181344	.2366664	-1.26	0.209	.2918647	1.309134
_Ihtenure_2	1.787962	.3838797	2.71	0.007	1.173824	2.723411
_Ihtenure_3	4.774383	3.008802	2.48	0.013	1.388329	16.41882
_Isclass_2	.6812868	.5144974	-0.51	0.611	.1550656	2.993259
_Isclass_3	.5189894	.3943751	-0.86	0.388	.1170411	2.301328
_Isclass_4	.5711055	.4226379	-0.76	0.449	.1339052	2.435763
_Isclass_5	.5860359	.44441	-0.70	0.481	.1325655	2.590705
_Isclass_6	.5467875	.4245435	-0.78	0.437	.1193763	2.504488
_Imhuposit~2	1.253571	.3778657	0.75	0.453	.6943367	2.263226
_Imhuposit~3	.2705297	.1355599	-2.61	0.009	.1013179	.7223439
_Imhuposit~4	.6668965	.1476928	-1.83	0.067	.4320648	1.029362

Appendix 7.0 LLTI Sensitivity Analysis ('permanently sick' category removed from economic status variable)

1. Cross Sectional 1991

Logistic regression — Number of obs = 39980
LR chi2(37) = 6996.70
Prob > chi2 = 0.0000
Log likelihood = -10274.022 — Pseudo R2 = 0.2540

ltillness9	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreatmen~1	.9661952	.036126	-0.92	0.358	.8979218	1.03966
_Itreatmen~2	(omitted)					
age9	1.03844	.0025951	15.09	0.000	1.033366	1.043539
age92	.9999689	.0000768	-0.40	0.686	.9998185	1.000119
_Isexten9_2	.7918362	.0345272	-5.35	0.000	.7269753	.8624841
_Imstatus9_2	1.196962	.1187099	1.81	0.070	.9855113	1.453781
_Imstatus9_3	1.37563	.129192	3.40	0.001	1.144356	1.653644
_Imstatus9_4	1.119433	.0826165	1.53	0.126	.9686739	1.293655
_Ieconomic~2	1.463203	.1493091	3.73	0.000	1.197969	1.78716
_Ieconomic~3	1.311372	.2185539	1.63	0.104	.9459411	1.817973
_Ieconomic~4	1.725878	.1566946	6.01	0.000	1.444536	2.062014
_Ieconomic~5	1.731163	.3813895	2.49	0.013	1.124116	2.666027
_Ieconomic~7	3.396794	.2854422	14.55	0.000	2.880981	4.004959
_Ieconomic~8	2.820696	.2470883	11.84	0.000	2.375704	3.349038
_Isclass9_2	1.423568	.4062632	1.24	0.216	.8136904	2.490562
_Isclass9_3	1.327927	.3831028	0.98	0.326	.7544061	2.337454
_Isclass9_4	1.144832	.3287223	0.47	0.638	.6521256	2.009797
_Isclass9_5	1.292212	.3718564	0.89	0.373	.7351665	2.271338
_Isclass9_6	1.208184	.3539209	0.65	0.519	.6804329	2.145265
_Isclass9_7	1.840974	.523909	2.14	0.032	1.053927	3.215768
_Iqual9_2	.7794851	.1112467	-1.75	0.081	.5892857	1.031074
_Iqual9_3	.7154323	.1481452	-1.62	0.106	.4767707	1.073563
_Iqual9_4	1.042702	.0925331	0.47	0.638	.8762365	1.240791
_Iqual9_5	1.038913	.0848733	0.47	0.640	.8851986	1.219319
_Iethnicit~2	1.432728	.3107754	1.66	0.097	.9365441	2.191792
_Ihtenure9_2	1.400586	.0641919	7.35	0.000	1.280258	1.532224
_Ihtenure9_3	1.202498	.1286562	1.72	0.085	.9750207	1.483048
centralhea~9	.9696815	.0405094	-0.74	0.461	.893448	1.05242
_Ihouseper~1	.9265922	.0598948	-1.18	0.238	.8163325	1.051744
_Icars9_1	.8297451	.0388882	-3.98	0.000	.7569216	.9095749
_Icars9_2	.8520298	.0781126	-1.75	0.081	.7118986	1.019745
_Icars9_3	.6619431	.145414	-1.88	0.060	.430359	1.018147
_Imhuposit~2	1.085344	.107434	0.83	0.408	.8939441	1.317724
_Imhuposit~3	.5486918	.0826122	-3.99	0.000	.408479	.7370333
_Imhuposit~4	.6486074	.0532157	-5.28	0.000	.5522606	.761762

2. Cross Sectional 2001

Logistic regression — Number of obs = 31602
LR chi2(38) = 7416.02
Prob > chi2 = 0.0000
Log likelihood = -10327.653 — Pseudo R2 = 0.2642

ltillness0	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreatmen~1	1.035993	.0385865	0.95	0.342	.9630594	1.11445
_Itreatmen~2	(omitted)					
age0	1.036772	.0024814	15.09	0.000	1.031919	1.041647
age02	1.000014	.0000769	0.18	0.855	.9998634	1.000165
_Isexten0_2	.8439797	.0347192	-4.12	0.000	.7786024	.9148466
_Imstatus0_2	1.330735	.1069853	3.55	0.000	1.136733	1.557845
_Imstatus0_3	1.311762	.1064428	3.34	0.001	1.118883	1.537892
_Imstatus0_4	1.319229	.1086087	3.37	0.001	1.122646	1.550235
_Ieconomic~2	1.508979	.1313412	4.73	0.000	1.272316	1.789664
_Ieconomic~3	1.776966	.2160552	4.73	0.000	1.400182	2.255142
_Ieconomic~4	2.439955	.2365514	9.20	0.000	2.017709	2.950564
_Ieconomic~5	2.117589	.270696	5.87	0.000	1.648279	2.720525
_Ieconomic~7	4.663025	.3767227	19.06	0.000	3.980152	5.463057
_Ieconomic~8	4.810646	.3256281	23.21	0.000	4.21295	5.493137
_Isclass0_2	1.256958	.2127237	1.35	0.177	.902124	1.751361
_Isclass0_3	1.22843	.2131148	1.19	0.236	.8743375	1.725923
_Isclass0_4	1.347511	.2338334	1.72	0.086	.9590101	1.893395
_Isclass0_5	1.305449	.2270406	1.53	0.125	.9283695	1.835688
_Isclass0_6	1.417743	.2551077	1.94	0.052	.9963979	2.017261
_Isclass0_7	1.562723	.2785925	2.50	0.012	1.101882	2.216302
_Iqual0_2	1.06871	.116291	0.61	0.541	.8634495	1.322765
_Iqual0_3	1.027362	.0846612	0.33	0.743	.8741359	1.207447
_Iqual0_4	.9294798	.0843179	-0.81	0.420	.778078	1.110342
_Iqual0_5	1.093491	.111479	0.88	0.381	.8954411	1.335344
_Iethnicit~2	.9585586	.1461883	-0.28	0.781	.7108913	1.292511
_Ihtenure0_2	1.52613	.0656839	9.82	0.000	1.402672	1.660454
_Ihtenure0_3	1.450071	.1061451	5.08	0.000	1.256265	1.673775
centralhea~0	1.13179	.0776936	1.80	0.071	.9893133	1.294786
_Ihouseper~1	.9910517	.0688327	-0.13	0.897	.8649217	1.135575
_Icars0_1	.5669954	.1076157	-2.99	0.003	.3908602	.8225032
_Icars0_2	.4676734	.0892532	-3.98	0.000	.3217325	.6798144
_Icars0_3	.3776335	.0750741	-4.90	0.000	.2557705	.5575587
_Imhuposit~2	1.143994	.1005925	1.53	0.126	.9628898	1.35916
_Imhuposit~3	.8194414	.0884261	-1.85	0.065	.6632306	1.012445
_Imhuposit~4	.8500445	.059817	-2.31	0.021	.7405309	.9757535

3. Selective Migration 1991

```
Logistic regression                               Number of obs   =      26372
                                                  LR chi2(41)     =    2163.95
                                                  Prob > chi2     =     0.0000
Log likelihood =  -4938.449                       Pseudo R2       =     0.1797

------------------------------------------------------------------------------
  ltillness9 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Itreateds~2 |   1.186896   .3074988     0.66   0.508     .7143073    1.972152
_Itreateds~3 |   1.117852   .1089645     1.14   0.253      .923447    1.353183
_Itreateds~4 |   1.022337   .3051865     0.07   0.941     .5695009    1.835242
_Itreateds~5 |    .957012   .0641274    -0.66   0.512     .8392282    1.091326
_Itreateds~6 |   .9792754   .0912776    -0.22   0.822     .8157647     1.17556
_Itreateds~7 |  (omitted)
_Itreateds~8 |  (omitted)
_Itreateds~9 |  (omitted)
        age9 |   1.035194   .0036733     9.75   0.000     1.028019    1.042419
       age92 |   .9998797   .0001298    -0.93   0.354     .9996254    1.000134
 _Isexten9_2 |   .7932551    .053864    -3.41   0.001     .6944072    .9061739
_Imstatus9_2 |   .9728432   .1443969    -0.19   0.853     .7272788    1.301322
_Imstatus9_3 |   1.221629   .1696856     1.44   0.150     .9304791    1.603881
_Imstatus9_4 |   .9403811    .116995    -0.49   0.621     .7368922    1.200062
_Ieconomic~2 |   1.272957   .1774585     1.73   0.083     .9686134    1.672926
_Ieconomic~3 |   1.350831   .3017373     1.35   0.178     .8719006    2.092837
_Ieconomic~4 |     1.8724   .2337726     5.02   0.000     1.465968    2.391513
_Ieconomic~5 |   1.516772   .5120206     1.23   0.217     .7826684    2.939426
_Ieconomic~7 |   3.423699   .4186754    10.06   0.000     2.694042    4.350978
_Ieconomic~8 |   2.783467   .3388208     8.41   0.000     2.192667    3.533456
 _Isclass9_2 |   1.278202   .4793545     0.65   0.513      .612886    2.665749
 _Isclass9_3 |   1.265111   .4821529     0.62   0.537     .5994087    2.670142
 _Isclass9_4 |   .9828451   .3741647    -0.05   0.964     .4660543    2.072687
 _Isclass9_5 |   1.265855   .4814082     0.62   0.535      .600717    2.667462
 _Isclass9_6 |   1.232314   .4783572     0.54   0.590     .5758425    2.637176
 _Isclass9_7 |   1.646105   .6221478     1.32   0.187     .7847745    3.452792
   _Iqual9_2 |   .8120578   .1580425    -1.07   0.285     .5545316     1.18918
   _Iqual9_3 |   .7425126   .2095489    -1.05   0.291     .4270525    1.291001
   _Iqual9_4 |   1.170759   .1511976     1.22   0.222     .9089478    1.507981
   _Iqual9_5 |    .865838   .1323172    -0.94   0.346     .6417357      1.1682
_Iethnicit~2 |    2.31452   .6978408     2.78   0.005     1.281796    4.179295
_Ihtenure9_2 |    1.50661   .1026577     6.02   0.000     1.318261    1.721869
_Ihtenure9_3 |    1.24102   .2124418     1.26   0.207     .8872931    1.735762
centralhea~9 |   .9175592   .0594231    -1.33   0.184     .8081807    1.041741
_Ihouseper~1 |   .8187613   .0890951    -1.84   0.066     .6615035    1.013404
   _Icars9_1 |   .8004485   .0544254    -3.27   0.001      .700579    .9145547
   _Icars9_2 |   .7957772   .0995942    -1.83   0.068      .622674    1.017003
   _Icars9_3 |   .6540749   .1913296    -1.45   0.147     .3686672    1.160434
_Imhuposit~2 |   .8436546   .1274571    -1.13   0.260     .6274331    1.134389
_Imhuposit~3 |   .4045499   .0882259    -4.15   0.000     .2638388    .6203054
_Imhuposit~4 |   .5578245   .0635431    -5.12   0.000     .4462058    .697364
------------------------------------------------------------------------------
```

4. Selective Migration 2001

Logistic regression — Number of obs = 31602
LR chi2(42) = 7417.54
Prob > chi2 = 0.0000
Log likelihood = -10326.896 — Pseudo R2 = 0.2642

ltillness0	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreateds~2	1.029954	.1969953	0.15	0.877	.7079653	1.498387
_Itreateds~3	(omitted)					
_Itreateds~4	1.021179	.2088576	0.10	0.918	.683926	1.524736
_Itreateds~5	1.048912	.0514601	0.97	0.330	.9527492	1.15478
_Itreateds~6	(omitted)					
_Itreateds~7	1.06603	.067005	1.02	0.309	.9424695	1.205789
_Itreateds~8	1.090268	.0622039	1.51	0.130	.9749197	1.219263
_Itreateds~9	(omitted)					
age0	1.037413	.0025479	14.96	0.000	1.032431	1.042419
age02	1.000005	.0000772	0.07	0.946	.9998539	1.000157
_Isexten0_2	.8444933	.0347447	-4.11	0.000	.7790682	.9154127
_Imstatus0_2	1.328359	.106702	3.53	0.000	1.134859	1.554853
_Imstatus0_3	1.302872	.1060146	3.25	0.001	1.110809	1.528143
_Imstatus0_4	1.315402	.1083391	3.33	0.001	1.119314	1.545842
_Ieconomic~2	1.511192	.1315693	4.74	0.000	1.274123	1.792371
_Ieconomic~3	1.771178	.2154082	4.70	0.000	1.395534	2.247937
_Ieconomic~4	2.438578	.2364738	9.19	0.000	2.01648	2.949031
_Ieconomic~5	2.111326	.2701122	5.84	0.000	1.643073	2.713024
_Ieconomic~7	4.657125	.376345	19.04	0.000	3.974952	5.456373
_Ieconomic~8	4.80433	.325311	23.18	0.000	4.207229	5.486172
_Isclass0_2	1.257791	.2128498	1.36	0.175	.9027419	1.75248
_Isclass0_3	1.231005	.2135512	1.20	0.231	.8761849	1.729513
_Isclass0_4	1.352553	.2347171	1.74	0.082	.9625868	1.900504
_Isclass0_5	1.30954	.2277534	1.55	0.121	.9312776	1.841445
_Isclass0_6	1.422255	.2559264	1.96	0.050	.9995594	2.0237
_Isclass0_7	1.569069	.2797653	2.53	0.012	1.1063	2.225417
_Iqual0_2	1.067156	.1161492	0.60	0.550	.8621506	1.320908
_Iqual0_3	1.022069	.0843458	0.26	0.791	.8694306	1.201504
_Iqual0_4	.9282897	.0842523	-0.82	0.412	.7770122	1.10902
_Iqual0_5	1.094233	.1115686	0.88	0.377	.896026	1.336284
_Iethnicit~2	.9489083	.1449473	-0.34	0.731	.703399	1.280108
_Ihtenure0_2	1.524076	.0656272	9.79	0.000	1.400728	1.658287
_Ihtenure0_3	1.439567	.1057527	4.96	0.000	1.246526	1.662503
centralhea~0	1.132864	.0777668	1.82	0.069	.9902525	1.296014
_Ihouseper~1	.997788	.0695941	-0.03	0.975	.8702988	1.143953
_Icars0_1	.5669197	.1076315	-2.99	0.003	.3907674	.8224791
_Icars0_2	.4675071	.0892479	-3.98	0.000	.3215825	.679648
_Icars0_3	.3775978	.0750888	-4.90	0.000	.2557173	.5575692
_Imhuposit~2	1.148892	.1010711	1.58	0.115	.9669333	1.365091
_Imhuposit~3	.8180145	.0882683	-1.86	0.063	.6620817	1.010672
_Imhuposit~4	.8469753	.0596649	-2.36	0.018	.7377482	.9723739

5. Difference in Difference

```
Conditional fixed-effects logistic regression   Number of obs      =      5676
Group variable: slsno                           Number of groups   =      2838

                                                Obs per group: min =         2
                                                              avg =       2.0
                                                              max =         2

                                                LR chi2(34)       =   2348.70
Log likelihood  = -792.80138                    Prob > chi2       =    0.0000
```

ltillness	OR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Iinter01_1	1.176346	.1662867	1.15	0.251	.8916825	1.551886
dummyvar	7.670941	1.018485	15.35	0.000	5.913343	9.950942
treatment	.8665338	.3314254	-0.37	0.708	.409472	1.833778
_Imstatus_2	1.621424	.7088704	1.11	0.269	.6882714	3.819737
_Imstatus_3	1.966128	1.015995	1.31	0.191	.7140921	5.413392
_Imstatus_4	1.847247	.8940928	1.27	0.205	.7153718	4.769997
_Isclass_2	.2898964	.2434791	-1.47	0.140	.0558899	1.503671
_Isclass_3	.5229954	.4412268	-0.77	0.442	.1000873	2.732856
_Isclass_4	.4828788	.4087706	-0.86	0.390	.0918907	2.53749
_Isclass_5	.3415775	.2877966	-1.27	0.202	.0655101	1.781026
_Isclass_6	.3512468	.3018005	-1.22	0.223	.0651985	1.892287
_Isclass_7	.4123628	.3438013	-1.06	0.288	.0804642	2.113275
_Ieconomic~2	1.403135	.3544525	1.34	0.180	.8552117	2.302107
_Ieconomic~3	1.585124	.7756037	0.94	0.346	.607532	4.135781
_Ieconomic~4	3.614431	.9221749	5.04	0.000	2.192133	5.959542
_Ieconomic~5	1.858476	.7995598	1.44	0.150	.7997427	4.318807
_Ieconomic~7	6.043494	1.480671	7.34	0.000	3.738881	9.76865
_Ieconomic~8	3.859227	.8659778	6.02	0.000	2.485981	5.991047
_Iqual_2	.5948506	.211972	-1.46	0.145	.2958602	1.195995
_Iqual_3	1.107906	.4341835	0.26	0.794	.5139502	2.388279
_Iqual_4	1.127552	.2782414	0.49	0.627	.6951671	1.828876
_Iqual_5	1.303172	.2626315	1.31	0.189	.8779244	1.934401
_Ihtenure_2	1.323629	.2177228	1.70	0.088	.9588544	1.827174
_Ihtenure_3	1.205813	.3424592	0.66	0.510	.6910876	2.10391
_Imhuposit~2	.8879356	.2589583	-0.41	0.684	.5013445	1.57263
_Imhuposit~3	.5899287	.2192414	-1.42	0.156	.2847466	1.222195
_Imhuposit~4	.7435108	.1596692	-1.38	0.168	.4880805	1.132617
_Icars_1	1.447788	.7207944	0.74	0.457	.5456654	3.841346
_Icars_2	1.030928	.525024	0.06	0.952	.3799571	2.797193
_Icars_3	1.11282	.6109484	0.19	0.846	.3794091	3.263942

Appendix 8.0 Hospital Admissions Sensitivity Analysis ('permanently sick' category removed from economic status variable)

1. Cross Sectional 1991

```
Logistic regression                               Number of obs   =      39616
                                                  LR chi2(37)     =    2107.00
                                                  Prob > chi2     =     0.0000
Log likelihood = -22183.724                       Pseudo R2       =     0.0453

------------------------------------------------------------------------------
hospadmiss~9 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Itreatmen~1 |   .9993768   .0239259    -0.03   0.979      .953566    1.047388
_Itreatmen~2 |  (omitted)
        age9 |   1.003587   .0013587     2.64   0.008     1.000927    1.006253
       age92 |    1.00071   .0000503    14.12   0.000     1.000612    1.000809
 _Isexten9_2 |   .8962531   .0244566    -4.01   0.000     .8495783    .9454921
_Imstatus9_2 |   1.273718   .0728595     4.23   0.000      1.13863    1.424833
_Imstatus9_3 |   1.381162   .0852397     5.23   0.000     1.223804    1.558753
_Imstatus9_4 |   1.310911   .0802387     4.42   0.000     1.162713    1.477998
_Ieconomic~2 |   1.173021   .0586595     3.19   0.001     1.063505    1.293814
_Ieconomic~3 |   .9116368   .0773702    -1.09   0.276      .771935    1.076621
_Ieconomic~4 |   1.076445   .0548876     1.44   0.149     .9740678    1.189581
_Ieconomic~5 |   .8971172   .0971825    -1.00   0.316     .7255054    1.109322
_Ieconomic~7 |   1.299833   .0768171     4.44   0.000     1.157667    1.459458
_Ieconomic~8 |   1.320498   .0704385     5.21   0.000     1.189413     1.46603
 _Isclass9_2 |   1.452384   .2031108     2.67   0.008     1.104191    1.910377
 _Isclass9_3 |   1.365334   .1956423     2.17   0.030     1.031022    1.808047
 _Isclass9_4 |   1.373221   .1961838     2.22   0.026      1.03785    1.816965
 _Isclass9_5 |   1.471089   .2112505     2.69   0.007      1.11021    1.949273
 _Isclass9_6 |   1.479523   .2193329     2.64   0.008     1.106458    1.978375
 _Isclass9_7 |   1.435617   .2078527     2.50   0.013     1.080934     1.90668
   _Iqual9_2 |   .9348228   .0695621    -0.91   0.365     .8079595    1.081606
   _Iqual9_3 |   .9002869   .0862796    -1.10   0.273     .7461144    1.086317
   _Iqual9_4 |   1.127533   .0721245     1.88   0.061     .9946735    1.278138
   _Iqual9_5 |   1.014477   .0730276     0.20   0.842     .8809843    1.168198
_Iethnicit~2 |   .7118229   .0956515    -2.53   0.011     .5470051    .9263018
_Ihtenure9_2 |   1.144553    .032409     4.77   0.000     1.082763    1.209869
_Ihtenure9_3 |   1.001766   .0655169     0.03   0.978     .8812449     1.13877
centralhea~9 |   .9839184   .0267846    -0.60   0.551     .9327975    1.037841
_Ihouseper~1 |   .8323907   .0412501    -3.70   0.000     .7553442    .9172962
   _Icars9_1 |    .984467   .0282584    -0.55   0.585     .9306108     1.04144
   _Icars9_2 |   1.069216   .0503697     1.42   0.155     .9749138     1.17264
   _Icars9_3 |   1.067452   .1034803     0.67   0.501     .8827378    1.290818
_Imhuposit~2 |   .8806387   .0528105    -2.12   0.034     .7829834    .9904738
_Imhuposit~3 |   1.400957   .1037367     4.55   0.000     1.211702    1.619771
_Imhuposit~4 |   1.040785   .0439649     0.95   0.344     .9580855    1.130622
------------------------------------------------------------------------------
```

2. Cross Sectional 2001

```
Logistic regression                               Number of obs   =      33193
                                                  LR chi2(38)     =    2763.23
                                                  Prob > chi2     =     0.0000
Log likelihood = -18106.401                       Pseudo R2       =     0.0709

------------------------------------------------------------------------------
hospadmiss~0 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Itreatmen~1 |   .9772657   .0261828    -0.86   0.391     .9272725    1.029954
_Itreatmen~2 |  (omitted)
        age0 |   1.005959   .0016235     3.68   0.000     1.002782    1.009146
       age02 |   1.000727   .0000559    13.01   0.000     1.000617    1.000836
 _Isexten0_2 |   .9921908   .0289491    -0.27   0.788     .9370435    1.050584
_Imstatus0_2 |   1.377568   .0751455     5.87   0.000     1.237885    1.533012
_Imstatus0_3 |   1.361701   .0838057     5.02   0.000     1.206965    1.536274
_Imstatus0_4 |   1.332605   .0910025     4.20   0.000     1.165665    1.523454
_Ieconomic~2 |   1.185658   .0631139     3.20   0.001     1.068191    1.316043
_Ieconomic~3 |   .8196777   .0720284    -2.26   0.024     .6899929    .9737368
_Ieconomic~4 |   1.121319   .0800415     1.60   0.109     .9749197    1.289701
_Ieconomic~5 |   .8710309   .0741015    -1.62   0.105     .7372572    1.029077
_Ieconomic~7 |   1.416218   .0901322     5.47   0.000     1.250135    1.604364
_Ieconomic~8 |   1.441708   .0710581     7.42   0.000     1.308952    1.587928
 _Isclass0_2 |   1.074727   .1181692     0.66   0.512      .866376    1.333185
 _Isclass0_3 |    1.06404   .1205687     0.55   0.584     .8521316    1.328647
 _Isclass0_4 |   1.150751   .1310655     1.23   0.218     .9205196    1.438565
 _Isclass0_5 |   1.096022   .1252663     0.80   0.422     .8760597    1.371212
 _Isclass0_6 |   1.056467   .1280582     0.45   0.650     .8330646    1.339779
 _Isclass0_7 |   1.151687   .1390805     1.17   0.242     .9089525    1.459243
   _Iqual0_2 |   1.003127   .0660179     0.05   0.962     .8817321    1.141236
   _Iqual0_3 |   .8222405   .0462099    -3.48   0.000     .7364806    .9179867
   _Iqual0_4 |   1.026266   .0724318     0.37   0.713     .8936839    1.178518
   _Iqual0_5 |   .9584052   .0820194    -0.50   0.620     .8104088    1.133429
_Iethnicit~2 |   .8889687   .0950018    -1.10   0.271     .7209758    1.096105
_Ihtenure0_2 |   1.181285   .0372528     5.28   0.000     1.110481    1.256602
_Ihtenure0_3 |   1.096243   .0590032     1.71   0.088     .9864892    1.218207
centralhea~0 |   .9307087   .0497316    -1.34   0.179      .838167    1.033468
_Ihouseper~1 |   .9384365   .0499527    -1.19   0.233     .8454651    1.041632
   _Icars0_1 |   1.064818   .1556711     0.43   0.667     .7995287    1.418133
   _Icars0_2 |   1.033931   .1521622     0.23   0.821     .7748567    1.379627
   _Icars0_3 |   1.010018   .1523841     0.07   0.947     .7514603    1.357538
_Imhuposit~2 |   .9434945   .0568274    -0.97   0.334     .8384378    1.061715
_Imhuposit~3 |    1.17589   .0866334     2.20   0.028     1.017781     1.35856
_Imhuposit~4 |   1.046905   .0483795     0.99   0.321     .9562502    1.146154
------------------------------------------------------------------------------
```

3. Selective Migration 1991

```
Logistic regression                               Number of obs   =      26305
                                                  LR chi2(41)     =     421.01
                                                  Prob > chi2     =     0.0000
Log likelihood = -14035.129                       Pseudo R2       =     0.0148

------------------------------------------------------------------------------
hospadmiss~9 | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_Itreateds~2 |   .9838521    .126118    -0.13   0.899     .7652723    1.264863
_Itreateds~3 |   1.113262   .0565951     2.11   0.035     1.007684      1.2299
_Itreateds~4 |   1.228856   .1634535     1.55   0.121     .9468478    1.594856
_Itreateds~5 |    .997061   .0395039    -0.07   0.941     .9225647    1.077573
_Itreateds~6 |   1.140875   .0532054     2.83   0.005     1.041218     1.25007
_Itreateds~7 |  (omitted)
_Itreateds~8 |  (omitted)
_Itreateds~9 |  (omitted)
        age9 |   .9980425   .0017929    -1.09   0.275     .9945347    1.001563
       age92 |   1.000696   .0000696    10.00   0.000     1.000559    1.000832
 _Isexten9_2 |   .9358761   .0326813    -1.90   0.058     .8739648    1.002173
_Imstatus9_2 |   1.203342   .0869609     2.56   0.010     1.044422    1.386443
_Imstatus9_3 |   1.346771   .1087599     3.69   0.000     1.149619    1.577732
_Imstatus9_4 |   1.316253    .122659     2.95   0.003     1.096523    1.580015
_Ieconomic~2 |    1.22555   .0728106     3.42   0.001     1.090839    1.376897
_Ieconomic~3 |   .9283262   .0944579    -0.73   0.465     .7604842    1.133212
_Ieconomic~4 |   1.060189   .0721763     0.86   0.391     .9277578    1.211524
_Ieconomic~5 |   1.076336   .1478324     0.54   0.592     .8223135     1.40883
_Ieconomic~7 |   1.253556   .1021258     2.77   0.006     1.068556    1.470585
_Ieconomic~8 |   1.409857   .0938654     5.16   0.000     1.237382    1.606373
 _Isclass9_2 |   1.575407   .2614406     2.74   0.006     1.137981    2.180975
 _Isclass9_3 |   1.420561   .2426252     2.06   0.040     1.016432    1.985368
 _Isclass9_4 |   1.458254   .2489495     2.21   0.027     1.043562    2.037737
 _Isclass9_5 |    1.58459   .2718265     2.68   0.007     1.132136    2.217866
 _Isclass9_6 |   1.521624   .2711904     2.36   0.019     1.073007    2.157805
 _Isclass9_7 |   1.360679   .2381052     1.76   0.078     .9656152    1.917377
   _Iqual9_2 |   .9511382   .0836486    -0.57   0.569     .8005419    1.130064
   _Iqual9_3 |   .9791896   .1096416    -0.19   0.851      .786242    1.219487
   _Iqual9_4 |   1.222667   .1033615     2.38   0.017     1.035976    1.443002
   _Iqual9_5 |   .7636908   .0993278    -2.07   0.038     .5918449    .9854333
_Iethnicit~2 |   .8450242   .1554563    -0.92   0.360     .5892185    1.211886
_Ihtenure9_2 |   1.110964   .0391572     2.99   0.003     1.036808    1.190424
_Ihtenure9_3 |   1.118369   .0940414     1.33   0.183     .9484385    1.318745
centralhea~9 |   .9688411   .0342485    -0.90   0.371      .903988    1.038347
_Ihouseper~1 |   .7628844   .0540318    -3.82   0.000     .6640058    .8764873
   _Icars9_1 |   1.014976   .0365074     0.41   0.679     .9458868    1.089112
   _Icars9_2 |   1.107083   .0622031     1.81   0.070     .9916402    1.235965
   _Icars9_3 |   1.145586    .128104     1.22   0.224     .9201171    1.426305
_Imhuposit~2 |   .7681557   .0592295    -3.42   0.001     .6604141    .8934744
_Imhuposit~3 |   1.267247   .1168339     2.57   0.060     1.057754    1.718231
_Imhuposit~4 |   1.017606   .0530509     0.33   0.738     .9187638    1.127082
------------------------------------------------------------------------------
```

4. Selective Migration 2001

Logistic regression — Number of obs = 32399
LR chi2(42) = 2574.83
Prob > chi2 = 0.0000
Log likelihood = -17554.918 — Pseudo R2 = 0.0683

hospadmiss~0	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Itreateds~2	1.068689	.1350905	0.53	0.599	.8341667	1.369146
_Itreateds~3	(omitted)					
_Itreateds~4	.7592044	.1150683	-1.82	0.069	.5640882	1.021811
_Itreateds~5	.9567025	.0371019	-1.14	0.254	.886679	1.032256
_Itreateds~6	(omitted)					
_Itreateds~7	1.066536	.0491635	1.40	0.162	.9744025	1.167382
_Itreateds~8	1.04798	.0443669	1.11	0.268	.9645328	1.138647
_Itreateds~9	(omitted)					
age0	1.007388	.0017073	4.34	0.000	1.004047	1.010739
age02	1.000718	.0000572	12.55	0.000	1.000606	1.00083
_Isexten0_2	1.007431	.0299363	0.25	0.803	.9504333	1.067848
_Imstatus0_2	1.337132	.0738318	5.26	0.000	1.199979	1.48996
_Imstatus0_3	1.291732	.081725	4.05	0.000	1.141087	1.462265
_Imstatus0_4	1.26174	.0889909	3.30	0.001	1.09884	1.448789
_Ieconomic~2	1.181139	.0634076	3.10	0.002	1.063177	1.312189
_Ieconomic~3	.8084554	.0718906	-2.39	0.017	.6791478	.9623828
_Ieconomic~4	1.122173	.0809869	1.60	0.110	.9741568	1.292679
_Ieconomic~5	.8582867	.0734775	-1.79	0.074	.7257071	1.015087
_Ieconomic~7	1.366206	.0901365	4.73	0.000	1.200487	1.554801
_Ieconomic~8	1.423147	.0715101	7.02	0.000	1.28967	1.570438
_Isclass0_2	1.067292	.1178057	0.59	0.555	.8596649	1.325065
_Isclass0_3	1.060132	.1206277	0.51	0.608	.8482146	1.324996
_Isclass0_4	1.135441	.1300819	1.11	0.268	.9070819	1.421289
_Isclass0_5	1.076361	.1237195	0.64	0.522	.8592488	1.348333
_Isclass0_6	1.048093	.1281484	0.38	0.701	.8247549	1.331909
_Isclass0_7	1.119321	.1366219	0.92	0.356	.8811685	1.42184
_Iqual0_2	.9854516	.0654665	-0.22	0.825	.8651421	1.122492
_Iqual0_3	.8034714	.0456388	-3.85	0.000	.7188205	.898091
_Iqual0_4	.9993895	.0743712	-0.01	0.993	.8637564	1.156321
_Iqual0_5	.9979328	.0882433	-0.02	0.981	.839137	1.186779
_Iethnicit~2	.8937812	.096267	-1.04	0.297	.7236864	1.103855
_Ihtenure0_2	1.175624	.0378225	5.03	0.000	1.103782	1.252142
_Ihtenure0_3	1.074008	.0589608	1.30	0.193	.9644464	1.196015
centralhea~0	.924474	.0502868	-1.44	0.149	.8309857	1.02848
_Ihouseper~1	.9620522	.0526988	-0.71	0.480	.8641158	1.071089
_Icars0_2	1.071581	.1610425	0.46	0.645	.798183	1.438626
_Icars0_3	1.04855	.1586189	0.31	0.754	.7795143	1.410439
_Icars0_4	1.024118	.1586587	0.15	0.878	.7559272	1.387459
_Icars0_5	1.149649	.1951052	0.82	0.411	.8243455	1.603325
_Imhuposit~2	.9709057	.0596742	-0.48	0.631	.8607165	1.095201
_Imhuposit~3	1.208832	.0898825	2.55	0.011	1.044901	1.398482
_Imhuposit~4	1.062026	.0498381	1.28	0.200	.9687031	1.16434

5. Difference in Difference

```
Conditional fixed-effects logistic regression   Number of obs      =     11338
Group variable: slsno                           Number of groups   =      5669

                                                Obs per group: min =         2
                                                              avg =       2.0
                                                              max =         2

                                                LR chi2(34)       =    471.23
Log likelihood  = -3693.8362                    Prob > chi2       =    0.0000
```

hospadmiss~n	OR	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Iinter01_1	.9675248	.0571478	-0.56	0.576	.8617575	1.086273
dummyvar	1.237661	.0690178	3.82	0.000	1.109519	1.380603
treatment	1.369916	.190553	2.26	0.024	1.043022	1.799263
_Imstatus_2	1.310499	.2016045	1.76	0.079	.9693701	1.771674
_Imstatus_3	1.08029	.2107644	0.40	0.692	.737006	1.583469
_Imstatus_4	1.897492	.3699993	3.28	0.001	1.294794	2.780731
_Isclass_2	.7666823	.1831757	-1.11	0.266	.4800057	1.224572
_Isclass_3	.7668218	.1853986	-1.10	0.272	.4774138	1.231669
_Isclass_4	.8382177	.2039106	-0.73	0.468	.5203406	1.350286
_Isclass_5	.7843308	.1897629	-1.00	0.315	.4881547	1.260205
_Isclass_6	.7785972	.1966514	-0.99	0.322	.4745956	1.277327
_Isclass_7	.7127977	.1732608	-1.39	0.164	.4426531	1.147808
_Ieconomic~2	1.179216	.1032167	1.88	0.060	.9933164	1.399906
_Ieconomic~3	.8460064	.14275	-0.99	0.322	.607781	1.177607
_Ieconomic~4	.9194169	.0943651	-0.82	0.413	.7518803	1.124285
_Ieconomic~5	1.189955	.203263	1.02	0.309	.8513964	1.663141
_Ieconomic~7	1.908181	.1731577	7.12	0.000	1.597266	2.279616
_Ieconomic~8	1.368243	.1185877	3.62	0.000	1.154485	1.621579
_Iqual_2	.9113837	.1168762	-0.72	0.469	.7088312	1.171817
_Iqual_3	.8723426	.120167	-0.99	0.321	.6659358	1.142725
_Iqual_4	1.209037	.1267607	1.81	0.070	.9844554	1.484852
_Iqual_5	2.837227	.3119129	9.49	0.000	2.287266	3.519424
_Ihtenure_2	1.119071	.0744581	1.69	0.091	.9822513	1.27495
_Ihtenure_3	.9345127	.11784	-0.54	0.591	.7298785	1.19652
_Imhuposit~2	.967279	.1105964	-0.29	0.771	.7730853	1.210253
_Imhuposit~3	.7333946	.1059607	-2.15	0.032	.5525305	.9734624
_Imhuposit~4	.8872876	.0696146	-1.52	0.127	.7608185	1.034779
_Icars_1	1.113596	.2755723	0.43	0.664	.6856269	1.808703
_Icars_2	.9823073	.2458243	-0.07	0.943	.6014958	1.604213
_Icars_3	.9220797	.2371231	-0.32	0.752	.5570221	1.526386